A DISTRIBUTIONAL CHECKLIST OF THE AMPHIBIANS OF HONDURAS

By John R. Meyer[1] and Larry David Wilson[2]

Abstract: The amphibian fauna of the Republic of Honduras is listed. For each of the 52 species present, brief synonymies, a statement of the entire range, a list of Honduran locality records, and a statement of the ecological distribution in Honduras are given. Keys for identification are provided. A list of species of questionable occurrence and a gazeteer of herpetological localities in Honduras are included.

Situated at the southeastern end of the Nuclear Core region (Schuchert, 1935) of Middle America, the Republic of Honduras has remained virtually unexplored herpetologically until recent years. Middle America was recently characterized as a distinct herpetofaunal region (Savage, 1966), owing in part to the separation of the Nuclear Core region from South America during much of the Tertiary. Duellman (1966) discussed the composition, ecology, and distribution of the recent herpetofauna of Middle America and characterized the area with regard to assemblages of amphibians and reptiles. These authors' hypotheses regarding the characteristics of the recent herpetofauna of Middle America, the role of the Nuclear Core region in the development of the Mesoamerican herpetofauna, and subsequent movements of extralimital elements into the area were of necessity made with only minimal distributional data for the amphibians and reptiles of Honduras. Previous treatments of the herpetofauna of the country have been limited to reports of collections by Werner (1896), Dunn and Emlen (1932), Schmidt (1933, 1936), Lynch and Fugler (1965), Meyer (1966), and Echternacht (1968) and a scattering of notes by a few other authors.

Since Honduras comprises nearly half the landmass involved in the Nuclear Core region, data on the composition and distribution of the herpetofauna of the country are desirable to evaluate present concepts and hypotheses regarding the Middle American herpetofauna. The present work is the first in a series of papers planned to elucidate the composition and relationships of the Honduran herpetofauna.

METHODS AND MATERIALS

Meyer first became involved with the Honduran herpetofauna during a trip to that country in 1963. Field studies in Honduras were undertaken by both of us in 1967, 1968, and 1971; additional trips were made by Wilson in 1969 and 1970.

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In addition to field studies, herpetological collections from Honduras in major museums have been examined. The total number of specimens examined (amphibians and reptiles) was approximately 7000. Of this total, about 3000 specimens representing 130 of the 196 species known from the country were collected by us.

Synonymies given for each species include the following in the order indicated: 1) Author citation; 2) First citation of the present combination; 3) All references known to us in which Honduran specimens are mentioned.

The complete range for each species is given, utilizing the elevational designations of Stuart (1963). These categories are: Low–0 to 600 meters; Moderate–600 to 1500 meters; Intermediate–1500 to 2700 meters; High–above 2700 meters.

Locality records and museum numbers given are for specimens examined by us, unless otherwise noted.

The distribution of each species in Honduras is given in terms of the ecologic formations (bioclimates) of Holdridge (1964). The extent of the various formations in Honduras is indicated in Figure 1 (pages 24 and 25).

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Order GYMNOPHIONA
Family Caeciliidae

KEY TO THE GENERA OF CAECILIANS IN HONDURAS

Primary annuli less than 115; secondary annuli less than 75 .... *Dermophis*

Primary annuli more than 120; secondary annuli more than 95 .... *Gymnopis*

Genus *Dermophis* Peters

Dermophis mexicanus (Duméril and Bibron)

Siphonops mexicanus Duméril and Bibron, 1841: 284.

Dermophis mexicanus: Peters, 1879: 937; Werner, 1896: 351; Dunn, 1928: 74.

Gymnopis clarkii Barbour, 1926: 191.

Gymnopis mexicana clarki: Dunn, 1942: 477.

Dermophis mexicana clarkii: Meyer, 1966: 172.

Dermophis mexicanus mexicanus: Taylor, 1968: 486.

Dermophis mexicanus clarkii: Taylor, 1968: 483.

Range.—Low and moderate elevations from Veracruz to Tabasco, México on the Atlantic versant and from Oaxaca, México to western Panamá on the Pacific; also on the Atlantic versant in northwestern Honduras and in Costa Rica.

Locality Records.—ATLÁNTIDA: Tela, MCZ 11047, 11779. CORTÉS: San Pedro Sula, AMNH 33386; 2 mi W San Pedro Sula, TCWC 19159-60; La Lima, JD (4); 4.5 mi ENE Villanueva, LACM 47201. VALLE: Amapala, USNM 51380.

Ecologic Distribution.—From sea level to 100 meters in the Tropical Moist Forest and Tropical Dry Forest formations. Individuals were found in and under rotting logs in gallery forest along streams.

Genus *Gymnopis* Peters

Gymnopis multiplicata Peters

Gymnopis multiplicata Peters, 1874: 616.
Gymnopis multiplicata multiplicata: Dunn, 1942: 464.

Range.—Low and moderate elevations from Guerrero, México to Guatemala on the Pacific versant and from Guatemala to western Panamá on the Atlantic; also on the Pacific versant in Costa Rica and western Panamá.

Locality Records.—EL PARAISO: Arenal, LACM 10979. OLANCHO: 4.5 km SE Catacamas, LSUMZ 21324. YORO: Progreso District, MCZ 11048.

Ecologic Distribution.—From near sea level to 400 meters in the Tropical Moist Forest and Tropical Dry Forest formations. One individual was found beneath a rotting log in gallery forest along a stream.

Order CAUDATA

Family Plethodontidae

KEY TO THE GENERA OF SALAMANDERS IN HONDURAS

1. Costal grooves more than 16 .... *Oedipina*
1. Costal grooves not more than 14 2
2. A well developed sublingual fold; hands and feet narrow, width less than length .... *Chiropterotriton*
2. No sublingual fold; hands and feet broad, width greater than length .... *Bolitoglossa*

Genus *Bolitoglossa* Duméril, Bibron, and Duméril

KEY TO THE SPECIES OF *BOLITOGLOSSA* IN HONDURAS

1. Toes fully webbed (webbing reaching distal end of terminal phalanx 3
1. Toes not fully webbed 2
2. Large species, reaching 105 mm snout-vent length; vomerine teeth 18-20 in series .... *schmidti*
2. Medium sized species, not over 60 mm snout-vent length; no more than 15 vomerine teeth in series .... *dunni*
3. Belly striped, yellow and blackish brown .... *striatula*
3. Belly not striped 4
4. Tail noticeably longer than snout-vent length .... *mexicana*
4. Tail noticeably shorter than snout-vent length 5
5. Maxillary teeth absent .... *rufescens*
5. Maxillary teeth present 6
6. Small species, not exceeding 40 mm snout-vent length; dorsal pattern of dark streaks and pepperings on light background .... *occidentalis*
6. Large species, exceeding 60 mm snout-vent length; dorsal pattern of dark mottling on lighter background .... *dofleini*

Bolitoglossa dofleini (Werner)

Spelerpes dofleini Werner, 1903: 352.
Bolitoglossa doffleini: (sic) Taylor, 1944: 219.
Range.—Low and moderate elevations of the Atlantic versant from Alta Verapaz, Guatemala to north central Honduras.
Locality Records.—YORO: Portillo Grande, FMNH 34681.
Ecologic Distribution.—Known only from about 1300 meters in the Subtropical Wet Forest Formation.

Bolitoglossa dunni (Schmidt)

Oedipus dunni Schmidt, 1933: 16.
Bolitoglossa dunni: Wake and Brame, 1963: 386; Brame, 1967: 18.
Oedipus morio: Dunn, 1926: 387 (in part).
Magnadigita dunni: Taylor, 1944: 218.
Range.—Moderate to high elevations of western Honduras.
Locality Records.—CORTÉS: mountains W of San Pedro Sula, FMNH 4544-45, 4547, 4550-51, 4553-54, 4559-60, 4562, UMMZ 80933. OCOTEPEQUE: 12.5 mi E Nueva Ocotepeque, LACM 46940. YORO: Portillo Grande, MCZ 21245-46.
Ecologic Distribution.—From 1500 to 1900 meters in the Lower Montane Wet Forest and Lower Montane Moist Forest formations. A single individual was found beneath a log in a clearing in the forest, and Schmidt (1942) reported finding this species in epiphytic bromeliads in the forest.

Bolitoglossa mexicana Duméril, Bibron, and Duméril

Bolitoglossa mexicana Duméril, Bibron, and Duméril, 1854: 93; Taylor, 1944: 224; Wake and Brame, 1963: 384.
Spelerpes variegatus var. C: Werner, 1896: 351.
Oedipus salvinii: Dunn, 1926: 408 (in part).
Oedipus platydactylus: Dunn, 1926: 400 (in part).
Bolitoglossa moreleti: Stuart, 1963: 17.
Range.—Low and moderate elevations of the Atlantic versant from Veracruz, México to Honduras; also possibly occurs on the Pacific versant in Honduras.
Locality Records.—ATLÁNTIDA: Tela District, MCZ 10214. COMAYAGUA: 8 km S La Misión, AMNH 54920, La Misión, MCZ 26422-23. CORTÉS: El Jaral, FMNH 4539-42; 1 mi W El Jaral, LACM 45300-04, 47620; La Lima, LACM 47621; Agua Azul, AMNH 54952; Cofradía, AMNH 45337-43. OLANCHO: 26 km NE Catacamas, LACM 45168, 45180. YORO: Subirana Valley, FMNH 21825 (3), MCZ 21235-41; Portillo Grande, MCZ 21242; Coyoles, LSUMZ 21325.
Ecologic Distribution.—Sea level to about 1400 meters in the Tropical Moist Forest, Tropical Dry Forest, Tropical Arid Forest, Subtropical Wet Forest, and Subtropical Moist Forest formations. This species was found in epiphytic

bromeliads, in bunches of bananas, and under rotting logs on the ground. In the drier formations it occurs along watercourses.

Bolitoglossa occidentalis Taylor

Bolitoglossa occidentalis Taylor, 1941: 145.

Range.—Low and moderate elevations of the Pacific versant from Chiapas, México to Honduras; also on the Atlantic versant in Honduras.

Locality Records.—COMAYAGUA: Barranca de Trincheras, FMNH 64647.

Ecologic Distribution.—Known only from about 1300 meters in the Subtropical Moist Forest Formation. According to data in the museum catalog, the single specimen from the country was found in an epiphytic bromeliad in pine-oak forest.

Bolitoglossa rufescens (Cope)

Oedipus rufescens Cope, 1869b: 104; Dunn and Emlen, 1932: 22.

Bolitoglossa rufescens: Taylor, 1941: 147.

Range.—Low and moderate elevations of the Atlantic versant from San Luis Potosí, México to north central Honduras.

Locality Records.—ATLÁNTIDA: mountains above Corozal, LACM 46941; Lancetilla (Dunn and Emlen, 1932). YORO: Subirana Valley, MCZ 21244; Portillo Grande, MCZ 21243, FMNH 34682.

Ecologic Distribution.—From near sea level to about 1400 meters in the Tropical Moist Forest and Subtropical Wet Forest formations. One individual was found in undisturbed forest at night, on the vegetation about two meters above ground.

Bolitoglossa schmidti (Dunn)

Oedipus schmidti Dunn, 1924: 96; Dunn, 1926: 361; Dunn and Emlen, 1932: 22.

Bolitoglossa schmidti: Taylor, 1944: 219; Wake and Brame, 1963: 386; Brame, 1967: 19.

Range.—Moderate elevations of northwestern Honduras.

Locality Records.—CORTÉS: mountains W of San Pedro Sula, MCZ 16287, FMNH 4538.

Ecologic Distribution.—Known only from about 650 meters in the Subtropical Wet Forest Formation.

Bolitoglossa striatula (Noble)

Oedipus striatulus Noble, 1918: 344.

Bolitoglossa striatula: Taylor, 1944: 219; Wake and Brame, 1963: 386; Brame, 1967: 19.

Range.—Low and moderate elevations of the Atlantic versant from northeastern Honduras to Costa Rica.

Locality Records.—GRACIAS A DIOS: Cropunta, MCZ 21251.
Ecologic Distribution.—Known only from about 50 meters in the Tropical Moist Forest Formation.

Genus *Chiropterotriton* Taylor

KEY TO THE SPECIES OF *CHIROPTEROTRITON* IN HONDURAS

Nostrils greatly enlarged; 2-3 costal folds between
adpressed limbs .... *nasalis*
Nostrils not noticeably enlarged; 4 costal folds between
adpressed limbs .... *barbouri*

Chiropterotriton barbouri (Schmidt)

Oedipus barbouri Schmidt, 1936: 43.
Chiropterotriton barbouri: Brame, 1967: 20.
?Pseudoeurycea barbouri: Taylor, 1944: 212.
Range.—Moderate and intermediate elevations of north central Honduras.
Locality Records.—CORTÉS: Agua Azul, AMNH 54949. YORO: Portillo Grande, MCZ 21247-50, FMNH 21866-67.
Ecologic Distribution.—From 750 to 1700 meters in the Subtropical Wet Forest and Lower Montane Wet Forest formations. According to Schmidt (1936), individuals were found in epiphytic bromeliads.

Chiropterotriton nasalis (Dunn)

Oedipus nasalis Dunn, 1924: 97; Dunn, 1926: 377.
Chiropterotriton nasalis: Taylor, 1944: 216; Rabb, 1960: 304; Brame, 1967: 20.
Range.—Intermediate and high elevations of northwestern Honduras.
Locality Records.—CORTÉS: mountains W of San Pedro Sula, FMNH 4564, 4568, 4571, 4578, 4581-84, 4586, 4589-90, 91462-63, UMMZ 80926 (2), USNM 103336-37. SANTA BÀRBARA: Cerro Santa Bárbara, E slope, 1900-2850 m, AMNH 55296-308, LACM 47195-200.
Ecologic Distribution.—From 1500 to about 2900 meters in the Lower Montane Wet Forest and Montane Rainforest formations. All individuals of this species have apparently been found in epiphytic bromeliads in the forest.

Genus *Oedipina* Keferstein

KEY TO THE SPECIES OF *OEDIPINA* IN HONDURAS

Dermal glands on head and dorsum profuse and conspicuous;
snout-vent length greater than 50 mm .... *stuarti*
Dermal glands absent or inconspicuous; snout-vent length
less than 45 mm .... *cyclocauda*

Oedipina cyclocauda Taylor

Oedipina cyclocauda Taylor, 1952a: 764; Brame, 1967: 20; Brame, 1968: 30.
Range.—Low and moderate elevations of the Atlantic versant from northern Honduras to western Panamá.
Locality Records.—ATLÁNTIDA: mountains above Corozal, LACM 47202-04, LSUMZ 21326. COLÓN: Río Claura, UMMZ 58610. YORO: Portillo Grande, FMNH 34683.
Ecologic Distribution.—From sea level to about 1400 meters in the Tropical Moist Forest and Subtropical Wet Forest formations. Individuals were found in the daytime on the forest floor and under logs and debris.

Oedipina stuarti Brame

Oedipina stuarti Brame, 1968: 47.
Range.—Low and moderate elevations of southern Honduras.
Locality Records.—FRANCISCO MORAZÁN: Tegucigalpa (Brame, 1968). VALLE: Isla Tigre, Amapala (Brame, 1968).
Ecologic Distribution.—From sea level to about 1000 meters in the Tropical Dry Forest and Subtropical Dry Forest formations. One individual was taken from the entrance to a mine (Brame, 1968).

Order ANURA

KEY TO THE GENERA OF ANURANS IN HONDURAS

1. A conspicuous tarsal tubercle present . . . . *Physalaemus*
1. No conspicuous tarsal tubercle 2
2. A conspicuous, enlarged parotoid gland . . . . *Bufo*
2. No enlarged parotoid gland 3
3. Four toes; two elongate, spade-shaped inner metatarsal tubercles present . . . . *Rhinophrynus*
3. Five toes; never two elongate, spade-shaped inner metatarsal tubercles present 4
4. A distinct transverse fold across head just posterior to eyes; a fleshy ridge across posterior area of roof of mouth 5
4. No transverse fold across head; no fleshy ridge across roof of mouth . . . 6
5. Only an inner metatarsal tubercle present . . . . *Gastrophryne*
5. Inner and outer metatarsal tubercles present . . . . *Hypopachus*
6. Web between toes IV-V, if present, incised to well below midpoint between proximal and distal tubercles of toe V 7
6. Web always present between toes IV-V, and incised no more deeply than midway between proximal and distal tubercles of toe V 8
7. No digital disks; rudimentary toe webbing; terminal phalanges claw-shaped . . . . *Leptodactylus*
7. Digital disks present on fingers II-IV; toe webbing variable; T-shaped terminal phalanges . . . . *Eleutherodactylus*

8. Small green frogs (white in preservative); venter transparent in life, translucent in preservative, so that internal organs are visible . . . . *Centrolenella*
8. Size and color variable; venter not transparent nor translucent 9
9. Tips of the three fingers (as opposed to thumb) pointed or blunt, never expanded to form adhesive disks . . . . *Rana*
9. Tips of the three fingers expanded to form adhesive disks 10
10. Pupil of eye vertical; a distinct and well-developed fold extending along forearm onto finger IV, with free edge at elbow and frequently throughout its length . . . . *Agalychnis*
10. Pupil of eye horizontal; no distinct fold extending from elbow onto finger IV, a row of tubercles or thickened skin along outer edge of forearm in some species but never free edged 11
11. A dense zone of glandular tissue indicated by thickened skin in occipital and frontal regions; paired, lateral vocal sacs in males . . . . *Phrynohyas*
11. No dense concentration of glandular tissue in occipital and frontal regions; vocal sacs in males single or paired, but never lateral 12
12. A projecting, rudimentary prepollex . . . . *Plectrohyla*
12. No projecting prepollex . . . . *Hyla, Ptychohyla, Smilisca*

Family Bufonidae

Genus *Bufo* Laurenti

KEY TO THE SPECIES OF *BUFO* IN HONDURAS

1. Large toads; triangular shaped parotoid glands, the length of which equals or exceeds the distance between the tip of the snout and anterior border of tympanum; a well-developed tarsal fold . . . . *marinus*
1. Small to medium sized toads; length of parotoid glands not exceeding distance from tip of snout to posterior border of eye; no tarsal fold 2
2. Parotoid glands small, the length not exceeding distance from tip of snout to preocular crest; dorsal warts small, often dark-tipped; interorbital region unicolor . . . . *luetkeni*
2. Parotoid glands generally as long as distance from tip of snout to anterior margin of eye; dorsal warts variable; itnerorbital region generally with alternating dark and light pattern 3
3. No conspicuous dorsolateral row of enlarged, pointed warts between parotoid and groin; parotoids round to oval . . . . *coccifer*
3. A conspicuous dorsolateral row of enlarged, pointed warts extending from parotoids almost to groin; parotoids triangular to subtriangular 4

4. Heels meeting or overlapping medially when thighs are extended at right angles to body; diameter of tympanum less than eye diameter . . . . *cavifrons*
4. Heels not meeting nor overlapping medially when thighs are extended at right angles to body; diameter of tympanum equal to or greater than eye diameter . . . . *valliceps*

Bufo cavifrons Firschein

Bufo cavifrons Firschein, 1950: 84.

Bufo valliceps valliceps: Lynch and Fugler, 1965: 8 (in part).

Range.—Low and moderate elevations of the Atlantic versant from Veracruz, México to Nicaragua.

Locality Records.—ATLÁNTIDA: mountains above Corozal, LACM 47305-22; Lancetilla, MCZ 16176-78. COLÓN: Balfate, AMNH 45721. YORO: Portillo Grande, MCZ 16179; Mataderos Mountains, MCZ 21254; Subirana Valley, MCZ 21257.

Ecologic Distribution.—From 50 to 1400 meters in the Tropical Moist Forest and Subtropical Wet Forest formations. Individuals were found under rotting logs in the forest and some were active on the forest floor in the daytime and at night.

Bufo coccifer Cope

Bufo coccifer Cope, 1866: 130; Dunn and Emlen, 1932: 22; Lynch and Fugler, 1965: 7.

Bufo ibarrai: Lynch and Fugler, 1965: 7 (in part).

Range.—Low, moderate, and intermediate elevations of the Pacific versant from Guatemala to Costa Rica; also occurs on the Atlantic versant in Honduras.

Locality Records.—CHOLUTECA: 1-2 mi E Choluteca, UMMZ 118359; 1.5 mi NW Choluteca, KU 65375-76; Choluteca, MSU 4503; San Francisco, KU 65374. COMAYAGUA: Siguatepeque, MCZ 26419; 7.5 mi NW Siguatepeque, KU 97527; 4 km W Siguatepeque, LSUMZ 22598. EL PARAISO: 4.4 mi SW Santa María, KU 97512-13; Monserrat, MCZ 26428-32, AMNH 54813, 54762; Lavenderos, MCZ 26442-46; road to Montaragua, AMNH 55135; La Montañuela, AMNH 54758-59. FRANCISCO MORAZÁN: 5.5 mi SW Valle de Ángeles, LACM 47970-71; 4.7 mi SW San Juancito, LACM 47972; Cerro El Picacho, MCZ 28864-66; 54 km S Tegucigalpa, LSUMZ 22262; Zamorano, MCZ 26370; 5 km W Zambrano, KU 65373; Cerro Uyuca, KU 97514-26, 103220-21, UMMZ 103007, AMNH 54760-61, 54818-22; Monte Crudo, AMNH 54757. INTIBUCÁ: La Esperanza, LACM 47997, 47999-48004, TCWC 23794-95, 23797-98; 1-2 mi NE La Esperanza, LACM 47992-96, 47998; 37 km E La Esperanza, TCWC 23796. OCOTEPEQUE: 1 km W Nueva Ocotepeque, TCWC 23672; 6.5 mi E Nueva

Ocotepeque, LACM 47986-91; 12.5 mi E Nueva Ocotepeque, LACM 47983-85; 13.5 mi E Nueva Ocotepeque, LSUMZ 22456. OLANCHO: 1 km NW Catacamas, LACM 47973-74; Pataste, MSU 4504-05. VALLE: 1 mi E Goascorán, LACM 47975-77; 3 mi E Goascorán, LACM 47978-82; San Lorenzo, MSU 4506.

Ecologic Distribution.—Sea level to 2000 meters in the Tropical Dry Forest, Subtropical Moist Forest, and Lower Montane Moist Forest formations. Apparently an inhabitant of open areas, shying away from the more heavily forested situations. Found breeding in temporary ponds and inundated areas in June, July, and August.

Bufo luetkeni Boulenger

Bufo luetkeni Boulenger, 1891: 455; Lynch and Fugler, 1965: 8; Meyer, 1966: 172.

Range.—Low and moderate elevations of the Pacific versant from southeastern Guatemala to Costa Rica; also on the Atlantic versant in Guatemala and Honduras.

Locality Records.—CHOLUTECA: 11 mi NE Choluteca, LSUMZ 21329; 12 km E Choluteca, KU 65509-10; 18 km NW Choluteca, KU 65511; Choluteca, MSU 4500-01; 1.5 km E San Marcos de Colón, LSUMZ 21328; 6 km W San Francisco, KU 65508. COMAYAGUA: 7.5 mi NW Siguatepeque, KU 97757; 17 km S Comayagua, TCWC 23799; 0.5 mi E Villa San Antonio, LACM 47949-68. FRANCISCO MORAZÁN: Zamorano, AMNH 54860, MCZ 26372-75, KU 97756. INTIBUCÁ: 5 mi S Jesús de Otoro, LACM 47969. OLANCHO: Juticalpa, TCWC 19161-62. VALLE: Amapala, MCZ 26447-49; 1 mi W Jícaro Galán, UMMZ 118349; San Lorenzo, MSU 4502; 13 mi SE Nacaome, KU 97755.

Ecologic Distribution.—Sea level to 1100 meters in the Tropical Dry Forest, Tropical Arid Forest, Subtropical Moist Forest, and Subtropical Dry Forest formations. Found under rocks in the daytime and on roads at night; found breeding in temporary ponds in June.

Bufo marinus (Linnaeus)

Rana marina Linnaeus, 1758: 211.

Bufo marinus: Schneider, 1799: 219; Dunn and Emlen, 1932: 22; Lynn, 1944: 189; Meyer, 1966: 173.

Bufo marinus horribilis: Lynch and Fugler, 1965: 8.

Range.—Low and moderate elevations from Texas to Brazil on the Atlantic versant and Sinaloa, México to South America on the Pacific.

Locality Records.—ATLÁNTIDA: Corozal, LSUMZ 21582-83; 1 km W La Ceiba, KU 101173; La Ceiba, USNM 117580-81; 20 mi E Tela, LACM 48165; Tela, UMMZ 58397-402, 67646 (10), 79969, MCZ 15183. CHOLUTECA: 6.3 km E Choluteca, KU 65527; Choluteca, UMMZ 118345.

COLÓN: Trujillo, LSUMZ 22470. COMAYAGUA: 2 mi E Villa San Antonio, LACM 48155; 3 mi SSE Comayagua, LACM 48168. COPÁN: 8 mi ENE Copán, LACM 48156-58; 12.5 mi SW Santa Rosa de Copán, LACM 48159; 4 mi SE Santa Rosa de Copán, LACM 48161; Copán, LSUMZ 22583; 9 km S La Entrada, LSUMZ 22585. CORTÉS: San Pedro Sula, USNM 128066-69; 2 mi W San Pedro Sula, LACM 48166-67; La Lima, KU 65526; El Jaral, LACM 45305; 1 mi W El Jaral, LACM 48162; 1 mi SE El Jaral, LACM 48163; 4.5 mi ENE Villanueva, LACM 48164. FRANCISCO MORAZÁN: 12 mi N Tegucigalpa, TCWC 19163; 17 mi SE Tegucigalpa, UMMZ 94054; 13.5 mi SSE Sabana Grande, LACM 48154; Zamorano, KU 103222; 15 km N Sabana Grande, LSUMZ 22615. GRACIAS A DIOS: Ahuas, LACM 45244; Tancin, LACM 48006-07, LSUMZ 21579; Patuca, USNM 20254-55, 20259; Kisalaya, LACM 11912. OCOTEPEQUE: 6.5 mi E Nueva Ocotepeque, LACM 48160. OLANCHO: San Luis, LACM 45167; 13 km S Catacamas, LACM 45232; 6.5 km SE Catacamas, LSUMZ 21578; 4.5 km SE Catacamas, LACM 48005. SANTA BÁRBARA: 8 km E Quimistán, LSUMZ 22642. VALLE: 1 mi E Goascorán, LACM 48152; 8.5 mi E Goascorán, LACM 48153; Nacaome, LACM 48169. YORO: 5 km E Coyoles, LSUMZ 21580; 0.5 km N Coyoles, LACM 48008; Coyoles, LSUMZ 21581; Rancho San Lorenzo, LACM 48009; Progreso, UMMZ 58396.

Ecologic Distribution.—Sea level to 1300 meters in the Tropical Moist Forest, Tropical Dry Forest, Tropical Arid Forest, Subtropical Wet Forest, Subtropical Moist Forest, and Subtropical Dry Forest formations. Found breeding in June, July, and August, and was frequently encountered foraging at night during these months.

Bufo valliceps Wiegmann

Bufo valliceps Wiegmann, 1833: 657; Dunn and Emlen, 1932: 22; Lynn, 1944: 189; Brattstrom and Howell, 1954: 116.

Bufo valliceps valliceps: Lynch and Fugler, 1965: 8.

Bufo ibarrai: Lynch and Fugler, 1965: 7 (in part).

Range.—Low and moderate elevations of the Atlantic versant from the southeastern United States to Nicaragua.

Locality Records.—ATLÁNTIDA: Corozal, LSUMZ 21608-12, 21614, LACM 48192-93, 48265; mountains above Corozal, LSUMZ 21613, LACM 48194; Lancetilla, AMNH 54783-87, 54789-90, MCZ 17978-79; Tela, MCZ 15184, 15597-600; 20 mi E Tela, LACM 48264; 36 km W Tela, MCZ 21253. COLÓN: 2 km E Trujillo, LACM 48195; Trujillo, LSUMZ 22491; Puerto Castilla, LSUMZ 22473; 0.5 km S Trujillo, LSUMZ 21615; Balfate, AMNH 45689, 45716-17, 45730-31; 49 km E La Ceiba, AMNH 55295. COMAYAGUA: Comayagua, TCWC 23800. COPÁN: Rancho El Jaral, LACM 45377-86; 8 mi ENE Copán, LACM 48200-14; 12 mi ENE Copán, LACM 48215; 14 mi N Santa Rosa de Copán, LACM 48216; 5 mi SE Santa Rosa de

Copán, LACM 48217; 4 mi SE Santa Rosa de Copán, LACM 48218-35; 4.3 mi SW Santa Rosa de Copán, LSUMZ 22457; 9 km S La Entrada, LSUMZ 22586-97. CORTÉS: Lago de Yojoa, AMNH 55131, MSU 4491-99; Agua Azul, AMNH 54928-29; La Lima, MCZ 26451-56; 7.5 mi SSE Puerto Cortés, LACM 48196; 3 mi E Puerto Cortés, LACM 48197-99; 1 mi SE El Jaral, LACM 48253-62; 1 mi NW El Jaral, LACM 48263; 2-3 mi W San Pedro Sula, LACM 48266-78; 3.2 km NE San Pedro Sula, KU 97713-22. EL PARAISO: 1 km N Santa María, LACM 45079; 6 km E Danlí, TCWC 23801; Arenal, LACM 11900, 12015, 20474; Valle de Jamastrán, AMNH 54763. FRANCISCO MORAZÁN: Rancho San Diego, AMNH 53948. GRACIAS A DIOS: Tancin, LACM 48184-85, LSUMZ 21600; Kiyras, LACM 11901; Patuca, USNM 20256-58; Río Coco, USNM 24542. OLANCHO: 8.8 mi E Dulci Nombre de Culmí, LACM 45147-49; 7.6 mi SW Juticalpa, LACM 45233; 0.5 km WNW Catacamas, LACM 48170-77, LSUMZ 21590-93, 21595; 1-1.5 km NW Catacamas, LACM 48178-81, LSUMZ 21596; 4.5 km SE Catacamas, LACM 48182-83, LSUMZ 21597-99, 21601; ca. 40 km E Catacamas, TCWC 23652; 9.1 mi E Campamento, LACM 45241. SANTA BÁRBARA: 14 mi SW Sula, LACM 48236-50; El Sauce, KU 65544; 5.5 mi SW El Jaral, LACM 48251-52; 17 km E Quimistán, LSUMZ 22614. YORO: 0.5 km N Coyoles, LACM 48186-90, LSUMZ 21602; Rancho San Lorenzo, LACM 48191, LSUMZ 21603-06; Subirana Valley, MCZ 21255-56; 2 km S Coyoles, KU 101179.

Ecologic Distribution.—Sea level to 1000 meters in the Tropical Moist Forest, Tropical Dry Forest, Tropical Arid Forest, Subtropical Wet Forest, and Subtropical Moist Forest formations. Found breeding in temporary ponds in cleared or brushy areas in June, July, and August; encountered at night during these months.

Family Centrolenidae

Genus *Centrolenella* Noble

Centrolenella fleischmanni (Boettger)

Hylella fleischmanni Boettger, 1893: 251.
Centrolenella fleischmanni: Noble, 1925: 66.
Centrolenella viridissima: Lynch and Fugler, 1965: 10.

Range.—Low and moderate elevations from Veracruz, México to Guyana on the Atlantic versant and Guerrero, México to Ecuador on the Pacific.

Locality Records.—ATLÁNTIDA: Corozal, LACM 47260, 47262; mountains above Corozal, LACM 47261. CORTÉS: Río Lindo, AMNH 54777; 1 mi W El Jaral, LACM 47263-64; 3 mi W San Pedro Sula, LACM 47265. EL PARAISO: Agua Fría, UMMZ 123100, AMNH 54815. LA PAZ: Marcala, TCWC 23812. OLANCHO: 0.5 km WNW Catacamas, LSUMZ 21319-20; 1.5 km NW Catacamas, LSUMZ 21321-22; 2 km NW Catacamas, LACM 47258-59, LSUMZ 21323. YORO: Portillo Grande, FMNH 34692-93.

Ecologic Distribution.—Sea level to 1400 meters in the Tropical Moist Forest, Subtropical Wet Forest, and Subtropical Moist Forest formations. Individuals were found calling along swift streams in the forest, and egg masses were found attached to the undersides of leaves over streams in June and July.

Family Hylidae

Genus *Agalychnis* Cope

KEY TO THE SPECIES OF *AGALYCHNIS* IN HONDURAS

Flanks blue to purple in life and in preservative, with several oblique light bars .... *callidryas*

Flanks orange in life (brown to purple in preservative), without light markings .... *moreletii*

Agalychnis callidryas (Cope)

Hyla callidryas Cope, 1862: 359.
Agalychnis callidryas: Cope, 1865b: 110.
Phyllomedusa dacnicolor: Funkhouser, 1957: 37 (in part).
Agalychnis callidryas taylori: Lynch and Fugler, 1965: 10 (in part).
Phyllomedusa callidryas: Savage and Heyer, 1967: 119.

Range.—Low and moderate elevations from Veracruz, México to Panamá on the Atlantic versant and Nicaragua to northwestern Panamá on the Pacific.

Locality Records.—ATLÁNTIDA: Corozal, LACM 47254-55, LSUMZ 21317-18; Toloa, USNM 74506; Lancetilla, MCZ 17980; 20 mi E Tela, LACM 47256-57. COLÓN: Balfate, AMNH 45687, 45720. CORTÉS: Lago de Yojoa, AMNH 54958-61; Agua Azul, AMNH 54939-42; Río Lindo, AMNH 54937-38; La Lima, LSUMZ 11752. OLANCHO: ca. 40 km E Catacamas, TCWC 23610.

Ecologic Distribution.—Sea level to 750 meters in the Tropical Moist Forest, Tropical Dry Forest, and Subtropical Wet Forest formations. This species was found calling from vegetation in the forest in July and August.

Agalychnis moreletii (Duméril)

Hyla moreletii Duméril, 1853: 169.
Agalychnis moreletii: Cope, 1860: 110; Werner, 1896: 351.
Agalychnis callidryas taylori: Lynch and Fugler, 1965: 10 (in part).
Phyllomedusa moreletii: Savage and Heyer, 1967: 112.

Range.—Moderate elevations of the Atlantic versant from Veracruz, México to Honduras.

Locality Records.—CORTÉS: Agua Azul, AMNH 54914.

Ecologic Distribution.—Known only from about 800 meters in the Subtropical Wet Forest Formation.

KEY TO THE SPECIES OF *HYLA*, *PTYCHOHYLA*, AND *SMILISCA* IN HONDURAS

1. A broad axillary web attaching to upper arm almost at the elbow . . . . *Hyla loquax*
1. Axillary web absent or inconspicuous 2
2. Upper jaw projecting strongly shelflike over lower jaw anteriorly . . . . *Hyla staufferi*
2. Upper jaw not projecting shelflike over lower jaw 3
3. Greatest diameter of tympanum at least two-thirds the length of eye; thighs generally mottled, spotted, or banded 4
3. Tympanum less than two-thirds (generally less than one-half) the length of eye; thighs immaculate, peppered with dark, or striped 5
4. Lips barred; flanks cream colored with bold brown or black mottling in groin; posterior surfaces of thighs brown with cream colored flecks . . . . *Smilisca baudinii*
4. Lips not barred; a narrow white labial stripe present; flanks cream colored with fine black venation; posterior surfaces of thighs pale brown, with or without darker flecks or small cream colored spots . . . . *Smilisca phaeota*
5. A dark stripe, generally with a narrow light border above, extending from eye above or through tympanum to varying lengths posteriorly 6
5. No dark stripe extending posteriorly from eye 7
6. Upper surface of thighs peppered with dark; dorsum yellow to reddish with scattered darker spots . . . . *Hyla picta*
6. Upper surface of thighs immaculate or with dark peppering restricted to knee region . . . . *Hyla microcephala*
7. Sides never mottled, but frequently with light brown pepperings . . . . *Hyla bromeliacea*
7. Sides with brown mottling on a lighter background 8
8. Males with lateral glands; nuptial tuberosities on thumbs composed of large discrete horny spines; rostral keel present . . . . *Ptychohyla spinipollex*
8. Males without lateral glands; nuptial tuberosities on thumbs composed of horny pads; no rostral keel . . . . *Hyla salvadorensis*

Genus *Hyla* Laurenti

Hyla bromeliacea Schmidt

Hyla bromeliacea Schmidt, 1933: 19; Stuart, 1948: 29; Lynch and Fugler, 1965: 11.

Range.—Moderate and intermediate elevations of the Atlantic versant from northeastern Guatemala to northern Honduras.

Locality Records.—ATLÁNTIDA: mountains above La Ceiba, MCZ 21301.

CORTÉS: mountains W of San Pedro Sula, FMNH 4718, 4720-22, MCZ 17431, 21302-03.
Ecologic Distribution.—Known only from about 1500 meters in the Lower Montane Wet Forest Formation. Schmidt (1942) reported finding this species in epiphytic bromeliads, where eggs also had been laid.

Hyla loquax Gaige and Stuart

Hyla loquax Gaige and Stuart, 1934: 1; Taylor, 1952b: 868; Lynch and Fugler, 1965: 11; Duellman, 1966: 271.
Hyla stadelmani Schmidt, 1936: 45; Lynch and Fugler, 1965: 11.
Range.—Low and moderate elevations of the Atlantic versant from Veracruz, México to Costa Rica; also on the Pacific versant in Honduras.
Locality Records.—ATLÁNTIDA: Corozal, LSUMZ 21316. COPÁN: 8 mi ENE Copán, LACM 47360-61; 12 mi ENE Copán, LACM 47362-64; 4-5 mi SE Santa Rosa de Copán, LACM 47365-69. CORTÉS: Lago de Yojoa, AMNH 54943-46, 54948, 54956; 1 mi NW El Jaral, LACM 47370-82, 47388-411; 2.5 mi E La Lima, LACM 47383-87. FRANCISCO MORAZÁN: Cerro Uyuca, AMNH 54847-52; Montaña de Guaimaca, AMNH 54905-08, UMMZ 123104. OLANCHO: 4.5 km SE Catacamas, LACM 45218. YORO: Subirana Valley, MCZ 21310-11, FMNH 21842.
Ecologic Distribution.—Sea level to 1000 meters in the Tropical Moist Forest, Tropical Dry Forest, Subtropical Wet Forest, and Subtropical Moist Forest formations. This species was found breeding in temporary ponds in cleared and brushy areas in June, July, and August.

Hyla microcephala Cope

Hyla microcephala Cope, 1886: 281.
Hyla underwoodi: Dunn and Emlen, 1932: 25; Lynn, 1944: 189.
Hyla microcephala martini: Lynch and Fugler, 1965: 10; Meyer, 1966: 173.
Hyla microcephala underwoodi: Duellman and Fouquette, 1968: 529.
Range.—Low and moderate elevations from Veracruz, México to Honduras and from Panamá to Venezuela on the Atlantic versant; occurs from Honduras to Panamá on the Pacific versant.
Locality Records.—ATLÁNTIDA: 2.5 mi S La Ceiba, LACM 47477-78. COLÓN: Trujillo, LACM 47424. COMAYAGUA: 2 km E Siguatepeque, LSUMZ 22602. COPÁN: 8 mi ENE Copán, LACM 47425-33; 12 mi ENE Copán, LACM 47434-44; 5 mi SE Santa Rosa de Copán, LACM 47445-48. CORTÉS: Agua Azul, AMNH 54917-19; Lago de Yojoa, AMNH 54957, 55134, MSU 4593-607, KU 64565-77; 1 mi NW El Jaral, LACM 47459-99, 47479-85; 2.5 mi E La Lima, LACM 47467-76. EL PARAISO: Valle de Jamastrán, AMNH 54807-12. FRANCISCO MORAZÁN: Zamorano, AMNH 54879-81, KU 103223, TCWC 19173-77; Santa Clara, AMNH 54873-78; Rancho San Diego, AMNH 54939; Montaña de Guaimaca, AMNH 54900-04. INTIBUCÁ: Viejo Intibucá, AMNH 54912-13. ISLAS DE LA

BAHÍA: Isla de Roatán, 0.5 km N Roatán, LSUMZ 21315; Isla de Guanaja, La Playa Hotel, LACM 47412-19. OLANCHO: 26 km NE Catacamas, LACM 45170; 1 km NW Catacamas, LSUMZ 21300-09; 4.5 km SE Catacamas, LSUMZ 21310-14, LACM 45217. SANTA BÁRBARA: 5 mi S Santa Bárbara, LACM 45311-13; 14 mi SW Sula, LACM 47449-58; 8 km E Quimistán, LSUMZ 22628-29; 28 km SW Chamelecón, LSUMZ 22624-27. YORO: Coyoles, LACM 47420; 1.5 km W Olanchito, LACM 47421-23.

Ecologic Distribution.—Sea level to 1000 meters in the Tropical Moist Forest, Tropical Dry Forest, Tropical Arid Forest, Subtropical Wet Forest, and Subtropical Moist Forest formations. This species was found breeding in temporary ponds in cleared and brushy areas in June, July, and August.

Hyla picta (Günther)

Hylella picta Günther, 1901: 286; Lynn, 1944: 190.

Hyla picta: Smith and Taylor, 1948: 85.

Range.—Low elevations of the Atlantic versant from San Luis Potosí, México to northern Honduras.

Locality Records.—ATLÁNTIDA: La Ceiba, USNM 117603; Lancetilla, MCZ 17982-87; 20 mi E Tela, LACM 47244. COPÁN: 12 mi ENE Copán, LACM 47231-43.

Ecologic Distribution.—Sea level to about 600 meters in the Tropical Moist Forest and Subtropical Wet Forest formations. This species was found calling from brush around a pond in a cleared area in June, and one individual was taken on the forest floor in late afternoon in July.

Hyla salvadorensis Mertens

Hyla salvadorensis Mertens, 1952: 169.

Ptychohyla spinipollex: Lynch and Fugler, 1965: 11 (in part).

Range.—Intermediate elevations of the Pacific versant from northwestern El Salvador to southeastern Honduras.

Locality Records.—FRANCISCO MORAZÁN: Cerro Uyuca, AMNH 54823, 54827-39, KU 103033, 103255-60. INTIBUCA: La Esperanza, LACM 47230. OCOTEPEQUE: 9 mi E Nueva Ocotepeque, LACM 47226-29, 47253; 12.5 mi E Nueva Ocotepeque, LACM 47224.

Ecologic Distribution.—From 1600 to 1900 meters in the Lower Montane Moist Forest Formation. This species was found calling in June along a small stream in a clearing and in a roadside seep. One individual was found calling from a wet rock along a stream in August, and larvae were found in a pool nearby.

Hyla staufferi Cope

Hyla staufferi Cope, 1865a: 195; Lynn, 1944: 189; Taylor, 1952b: 865; Lynch and Fugler, 1965: 11; Meyer, 1966: 173; Duellman, 1966: 274.

Hyla culex Dunn and Emlen, 1932: 24; Dunn, 1933: 61.

Range.—Low and moderate elevations from Tamaulipas, México to Panamá on the Atlantic versant and from Guerrero, México to Panamá on the Pacific.

Locality Records.—ATLÁNTIDA: Corozal, LACM 47208-10; Tela, MCZ 16098. CHOLUTECA: 2.5 mi E San Marcos de Colón, LACM 47211; 1.2 mi E Choluteca, UMMZ 118395 (7); 10 km E Choluteca, KU 65045; Choluteca, KU 85361-66; 6.2 km E Choluteca, KU 65046-56; 2 mi NE Choluteca, KU 100500-01. COMAYAGUA: 12 km NW Siguatepeque, KU 107070; 3 mi SSE Comayagua, LACM 47221-23; 2 km E Siguatepeque, LSUMZ 22618; 4 km W Siguatepeque, LSUMZ 22617. COPÁN: 8 mi ENE Copán, LACM 47213-16; 5 mi SE Santa Rosa de Copán, LACM 47218-19. CORTÉS: 3 km E Santa Cruz de Yojoa, LACM 45273-74; E side Lago de Yojoa, KU 65038-44; Agua Azul, TCWC 19178-79, AMNH 54930, 54950, 54962, 55133. EL PARAISO: Valle de Jamastrán, AMNH 54800-04. FRANCISCO MORAZÁN: 22 mi W Guaimaca, LACM 45089-94; Zamorano, AMNH 54863-72, KU 103224; 8.6 mi NW Comayagüela, KU 100499. GRACIAS A DIOS: Tancin, LSUMZ 21274-75; Patuca, USNM 20262; Laguna Èbano, MCZ 21304-06. ISLAS DE LA BAHÍA: Isla de Guanaja, 5.5 mi W Sabana Bight, TCWC 21551. OCOTEPEQUE: 6.5 mi E Nueva Ocotepeque, LACM 47217. OLANCHO: 8.6 mi E Catacamas, LACM 45109-10; 4.5 km SE Catacamas, LSUMZ 21270-73; 26 km NE Catacamas, LACM 45171-77; Pataste, MSU 4565-66; 6 mi E Catacamas, LACM 45135. SANTA BÁRBARA: 5 mi S Santa Bárbara, LACM 45314-20. VALLE: 2 mi E Goascorán, LACM 47212. YORO: 1.5 km W Olanchito, LACM 47206-07.

Ecologic Distribution.—Sea level to 1300 meters in the Tropical Moist Forest, Tropical Dry Forest, Tropical Arid Forest, Subtropical Wet Forest, and Subtropical Moist Forest formations. Found calling from the edges of temporary ponds in cleared and brushy areas in June, July, and August; also taken at night on vegetation along streams, and one individual was found during the daytime in rotting log in an open pine forest.

Genus *Phrynohyas* Fitzinger

Phrynohyas venulosa (Laurenti)

Rana venulosa Laurenti, 1768: 31.

Phrynohyas venulosa: Hemming, 1958: 169; McDiarmid, 1968: 4.

Hyla venulosa: Dunn and Emlen, 1932: 24; Lynn, 1944: 189.

Phrynohyas spilomma: Duellman, 1956: 28; Lynch and Fugler, 1956: 12; Meyer, 1966: 173.

Range.—Low and moderate elevations from Tamaulipas, México to Costa Rica on the Atlantic versant and from Sinaloa, México to Panamá on the Pacific.

Locality Records.—ATLÁNTIDA: Corozal, LACM 47325-26, 47330-31; La Ceiba, USNM 117601-02. COMAYAGUA: between La Misión and Trincheras, AMNH 54910; 3 mi SSE Comayagua, LACM 47336. CORTÉS: 7 km SW La Lima, KU 64066; 1 mi W La Lima, TCWC 19180-84; 3 km E Santa Cruz de Yojoa, LACM 45267-72; Agua Azul, AMNH 54915-16; 1 mi SE El Jaral, LACM 47327-29, 47335; 19 mi N San Pedro Sula, LACM

47332-34. EL PARAISO: 1 km N Santa María, LACM 45070; Valle de Jamastrán, AMNH 54799. GRACIAS A DIOS: Tancin, LSUMZ 21298. OLANCHO: 26 km NE Catacamas, LACM 45169; 4.5 km SE Catacamas, LSUMZ 21297. YORO: 0.5 km N Coyoles, LSUMZ 21299, LACM 47323-24.

Ecologic Distribution.—Sea level to 900 meters in the Tropical Moist Forest, Tropical Dry Forest, Tropical Arid Forest, Subtropical Wet Forest, and Subtropical Moist Forest formations. Found calling from vegetation at night in June and July; adults and juveniles were found on roads during rains at night in July and August.

Genus *Plectrohyla* Brocchi

Plectrohyla guatemalensis Brocchi

Plectrohyla guatemalensis Brocchi, 1877a: 92.

Range.—Intermediate elevations of both versants from Chiapas, México to Honduras.

Locality Records.—OCOTEPEQUE: 12.5 mi E Nueva Ocotepeque, LACM 47245. YORO: Portillo Grande, FMNH 34694-95, 34698-99.

Ecologic Distribution.—Known only from about 1900 meters in the Lower Montane Wet Forest and Lower Montane Moist Forest formations. One individual was found in a hole in a rock outcropping along a stream in a clearing, and larvae were found in a nearby stream in June.

Genus *Ptychohyla* Taylor

Ptychohyla spinipollex (Schmidt)

Hyla spinipollex Schmidt, 1936: 45.

Ptychohyla spinipollex: Stuart, 1954: 48; Duellman, 1963: 327; Lynch and Fugler, 1965: 11 (in part).

Hyla euthysanota: Dunn and Emlen, 1932: 25.

Range.—Moderate and intermediate elevations of the Atlantic versant from Guatemala to Honduras; also on the Pacific versant in Honduras.

Locality Records.—ATLÁNTIDA: mountains above La Ceiba, MCZ 21300. FRANCISCO MORAZÁN: Cerro Uyuca, UMMZ 123102, AMNH 54824-26, KU 103225; San Juancito Mountains, AMNH 54897 (2). OCOTEPEQUE: 12.5 mi E Nueva Ocotepeque, LACM 47250-52. OLANCHO: 2 km NW Catacamas, LACM 47247-49, LSUMZ 21267-69.

Ecologic Distribution.—From 700 to 1900 meters in the Subtropical Wet Forest and Lower Montane Moist Forest formations. Found calling from vegetation along small streams at night in June, and larvae were found in a small stream in June.

Genus *Smilisca* Cope

Smilisca baudinii (Duméril and Bibron)

Hyla baudinii Duméril and Bibron, 1841: 564; Werner, 1896: 350; Dunn and Emlen, 1932: 24; Lynn, 1944: 189.

Smilisca baudinii: Cope, 1875: 31; Lynch and Fugler, 1965: 12; Duellman and Trueb, 1966: 289.

Smilisca phaeota cyanosticta: Lynch and Fugler, 1965: 12.

Range.—Low, moderate, and intermediate elevations from southern Texas on the Atlantic versant and southern Sonora, México on the Pacific to Costa Rica.

Locality Records.—ATLÁNTIDA: Corozal, LACM 48323-24, 48330; Lancetilla, MCZ 16207-11; Tela, USNM 82173-74; La Ceiba, USNM 117589-91; 20 mi E Tela, LACM 48345-47; 2.5 mi S La Ceiba, LACM 48348. CHOLUTECA: few miles N Pespire, AMNH 54816; 10-12 km E Choluteca, KU 64225-27, 64233; 1.5 km NW Choluteca, KU 64228-32. COLÓN: Balfate, AMNH 45688, 45719, 45692-95, 45723-24, 45729; Puerto Castilla, LSUMZ 22471. COMAYAGUA: 0.5 mi E Villa San Antonio, LACM 48331; 17 km S Comayagua, TCWC 23806; La Misión, MCZ 26424-25; 2 km E Siguatepeque, LSUMZ 22621. COPÁN: 8 mi ENE Copán, LACM 48325-26; 12 mi ENE Copán, LACM 48327-28; 4 mi SE Santa Rosa de Copán, LACM 48329; 9 km S La Entrada, LSUMZ 22606-13. CORTÉS: Río Lindo, AMNH 54792; Agua Azul, AMNH 54921-27; Lago de Yojoa, AMNH 55130; Cofradía, AMNH 45345-50; 5 mi SSE Puerto Cortés, LACM 48332; 3 mi E Puerto Cortés, LACM 48333; 1 mi W El Jaral, LACM 48339, 48343; 1 mi SE El Jaral, LACM 48340, 48342; 2 mi SE El Jaral, LACM 48431; La Lima, LACM 48344; 2 mi W San Pedro Sula, LACM 48349; Potrerillos, LSUMZ 11771. EL PARAISO: Arenal, LACM 16848; 21 km E Danlí, TCWC 23807; Valle de Jamastrán, AMNH 54805-06; Monserrat, MCZ 26436. FRANCISCO MORAZÁN: 5.5 mi SW Valle de Ángeles, LSUMZ 21475-78; 31 km SE Tegucigalpa, LACM 39760-61; 1 km SSE Zamorano, LACM 39762; Zamorano, AMNH 54862, 54882; Cerro Uyuca, AMNH 54853-54; Tegucigalpa, MSU 4589, USNM 60499. GRACIAS A DIOS: Tancin, LSUMZ 21287-90; Patuca, USNM 20261. ISLAS DE LA BAHÍA: Isla de Utila, Utila, UF 28397; Isla de Roatán, 0.5–2 km N Roatán, LSUMZ 21291-93, 22375; Isla de Guanaja, 1 mi E of west end of island, TCWC 21964; Isla de Guanaja, La Playa Hotel, LSUMZ 21294-95. OCOTEPEQUE: 1 km W Nueva Ocotepeque, TCWC 23677-81. OLANCHO: ca. 40 km E Catacamas, TCWC 23612; 0.5 km WNW Catacamas, LSUMZ 21276-80; 1 km SE Catacamas, LSUMZ 21281; 1 km NW Catacamas, LSUMZ 21282-83; 4.5 km SE Catacamas, LSUMZ 21284-85; Catacamas, LSUMZ 21286; Pataste, MSU 4578-82. SANTA BÁRBARA: 5 mi S Santa Bárbara, LACM 45321; 9 km N Santa Bárbara, LACM 45322; Quimistán, USNM 128062-65; 8 km E Quimistán, LSUMZ 22619; 17 km E Quimistán, LSUMZ 22599; 14 mi SW Sula, LACM 48334-38; 28 km SW Chamelecón, LSUMZ 22664-65. VALLE: San Lorenzo, MSU 4567-77. YORO: 0.5 km N Coyoles, LSUMZ 21296; Coyoles, LACM 48302-21.

Ecologic Distribution.—Sea level to 1900 meters in the Tropical Moist Forest, Tropical Dry Forest, Tropical Arid Forest, Subtropical Wet Forest, Subtropical Moist Forest, and Lower Montane Moist Forest formations. This species was found breeding in temporary ponds in June, July, and August, and recently transformed young were found in late June. During the daytime individuals were found beneath the outer sheaths of banana plants, in bromeliads, and in the rolled leaves of heliconias.

Smilisca phaeota (Cope)

Hyla phaeota Cope, 1862: 358.
Smilisca phaeota: Starrett, 1960: 303.

Range.—Low and moderate elevations from eastern Honduras to northern South America on the Atlantic versant and from Costa Rica to Ecuador on the Pacific.

Locality Records.—GRACIAS A DIOS: Kiyras, LACM 16849; Río Coco, USNM 24543. OLANCHO: ca. 40 km E Catacamas, TCWC 23613.

Ecologic Distribution.—Sea level to 500 meters in the Tropical Moist Forest Formation.

Family Leptodactylidae

Genus *Eleutherodactylus* Duméril and Bibron

KEY TO THE SPECIES OF *ELEUTHERODACTYLUS* IN HONDURAS

1. No inner tarsal fold present 2
1. An inner tarsal fold present 4
2. First finger longer than second; a series of outer tarsal tubercles; underside of tarsus and foot black in life . . . . *biporcatus*
2. First finger shorter than or equal to second; no series of outer tarsal tubercles; underside of tarsus and foot reddish brown to brown in life 3
3. Plantar tubercles present and well developed . . . . *ridens*
3. Plantar tubercles absent . . . . *milesi*
4. A dark face mask present 5
4. No dark face mask 7
5. Outer two fingers with noticeably expanded tips, forming flattened disks . . . . *noblei*
5. Tips of outer two fingers not noticeably expanded 6
6. Conspicuous lateral fringing on toes; foot about one-third webbed . . *mimus*
6. No conspicuous lateral fringing on toes; foot with only rudimentary basal webbing . . . . *gollmeri*
7. Conspicuous lateral fringing on toes; foot about one-third webbed; finger and toe disks noticeably expanded . . . . *merendonensis*
7. No conspicuous lateral fringing on toes; foot with only rudimentary basal webbing; finger and toe disks not noticeably expanded 8
8. A prominent ventral disk; a transverse scapular fold; head broad, particularly in adult males . . . . *laticeps*

8. No prominent ventral disk; no transverse scapular fold; head not noticeably enlarged . . . . *rugulosus*

Eleutherodactylus biporcatus (Peters)

Strabomantis biporcatus Peters, 1863: 405.
Eleutherodactylus biporcatus: Dunn, 1931: 410.
Eleutherodactylus rugosus: Brattstrom and Howell, 1954: 116.
Range.—Low elevations from eastern Honduras on the Atlantic versant and Costa Rica on the Pacific to Ecuador.
Locality Records.—EL PARAISO: Arenal, LACM 16847.
Ecologic Distribution.—Known only from about 400 meters in the Tropical Moist Forest Formation.

Eleutherodactylus gollmeri (Peters)

Hylodes gollmeri Peters, 1863: 409.
Eleutherodactylus gollmeri: Dunn and Emlen, 1932: 24.
Hylodes rostralis Werner, 1896: 350.
Eleutherodactylus rhodopis: Lynch and Fugler, 1965: 9.
Range.—Low, moderate, and intermediate elevations of the Atlantic versant from Guatemala to Panamá.
Locality Records.—ATLÁNTIDA: mountains above Corozal, LACM 47266-67; Lancetilla, MCZ 16189-90, 16280-82, 17451-54. CORTÉS: mountains W of San Pedro Sula, MCZ 17437-38; Lago de Yojoa, MSU 4539; 1 mi SE El Jaral, LACM 47533-47, 47549-53. SANTA BÁRBARA: 5.5 mi SW El Jaral, 47548. YORO: Mataderos Mountains, MCZ 21278-79; Portillo Grande, MCZ 21276-77.
Ecologic Distribution.—Sea level to 1600 meters in the Tropical Moist Forest, Subtropical Wet Forest, and Lower Montane Wet Forest formations. Individuals were found during the daytime on the forest floor, and a large series was taken from pits dug in a coffee plantation.

Eleutherodactylus laticeps (Duméril)

Hylodes laticeps Duméril, 1853: 178.
Eleutherodactylus laticeps: Kellogg, 1932: 106.
Range.—Low and moderate elevations of the Atlantic versant from Chiapas, México to Honduras.
Locality Records.—"Honduras," USNM 118203.
Ecologic Distribution.—Although this is a distinctive and apparently valid species, the identity of the few specimens allocated to it appears in some cases to be questionable. Consequently, nothing concerning the ecology of the species can be said at this time.

Eleutherodactylus merendonensis Schmidt

Eleutherodactylus merendonensis Schmidt, 1933: 17.

Eleutherodactylus rugulosus rugulosus: Lynch, 1965: 110 (in part).

Range.—Known only from low elevations in northwestern Honduras.

Locality Records.—CORTÉS: Santa Ana Canyon, FMNH 4672, LACM 48010-22.

Ecologic Distribution.—Known only from about 200 meters in the Tropical Moist Forest Formation. This species was found on rocks and canyon walls along a stream at night.

Eleutherodactylus milesi Schmidt

Eleutherodactylus milesi Schmidt, 1933: 18; Lynch and Fugler, 1965: 9; Lynch, 1965: 112.

Eleutherodactylus stadelmani Schmidt, 1936: 44.

Range.—Intermediate elevations of the Atlantic versant in northern Honduras.

Locality Records.—ATLÁNTIDA: mountains above La Ceiba, MCZ 21293-94. CORTÉS: mountains W of San Pedro Sula, FMNH 4699-711, 4713, 21820, 21829, USNM 118202, MCZ 21295-99. YORO: Portillo Grande, FMNH 21862-64, MCZ 21290; Santa Marta, MCZ 21291.

Ecologic Distribution.—From 1400 to 1700 meters in the Subtropical Wet Forest and Lower Montane Wet Forest formations. This species was taken by Schmidt (1942) in and around a small spring in the forest.

Eleutherodactylus mimus Taylor

Eleutherodactylus mimus Taylor, 1955: 517.

Range.—Low and moderate elevations of the Atlantic versant from northeastern Honduras to Costa Rica.

Locality Records.—OLANCHO: ca. 40 km E Catacamas, TCWC 23614.

Ecologic Distribution.—Known only from about 500 meters in the Tropical Moist Forest Formation.

Eleutherodactylus noblei Barbour and Dunn

Eleutherodactylus noblei Barbour and Dunn, 1921: 161.

Range.—Low and moderate elevations of the Atlantic versant from northeastern Honduras to Colombia.

Locality Records.—OLANCHO: 2.5 km NW Catacamas, LACM 47856-57.

Ecologic Distribution.—Known only from about 700 meters in the Subtropical Wet Forest Formation. This species was found in the daytime on the forest floor in a coffee plantation.

Eleutherodactylus ridens (Cope)

Phyllobates ridens Cope, 1866: 131.

Eleutherodactylus ridens: Taylor, 1952b: 690.

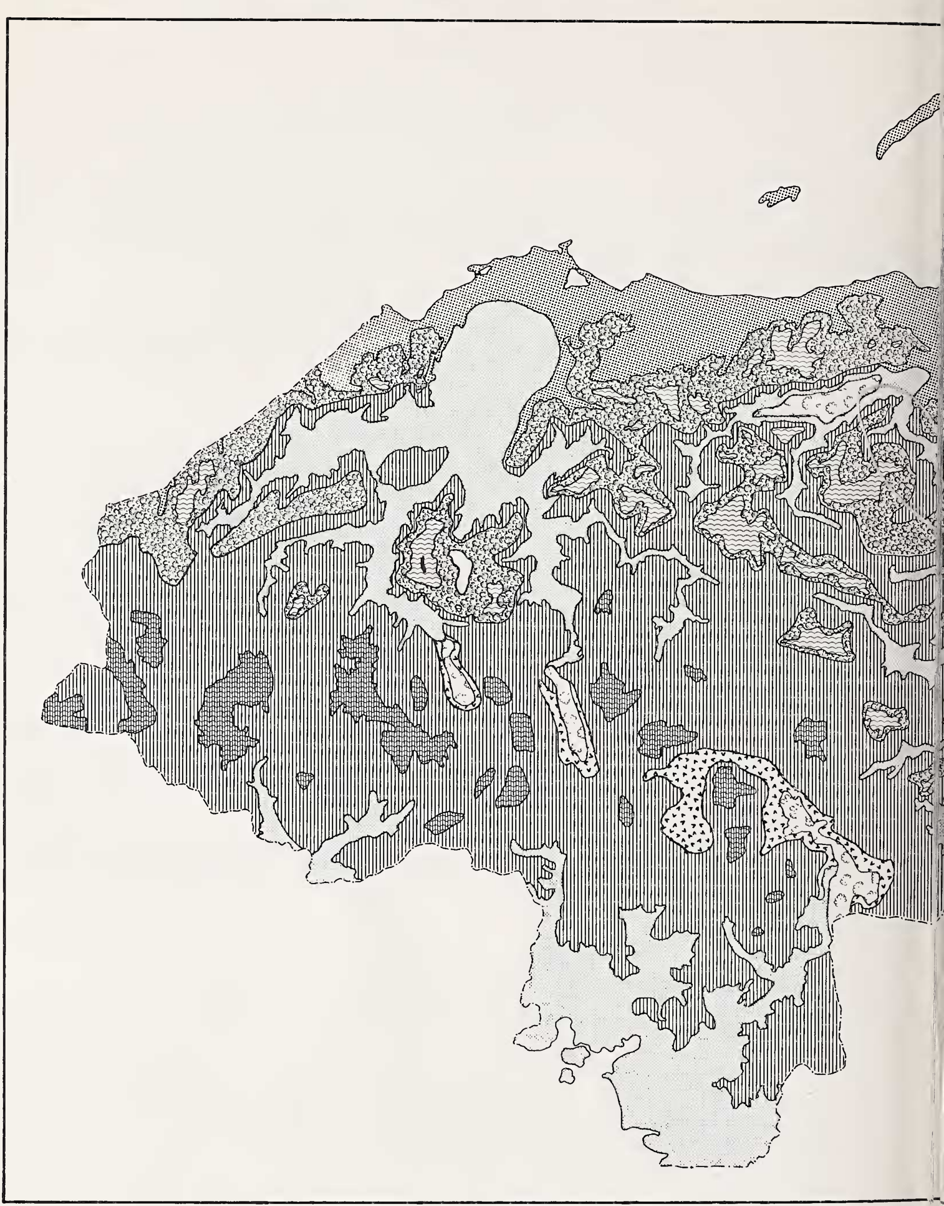
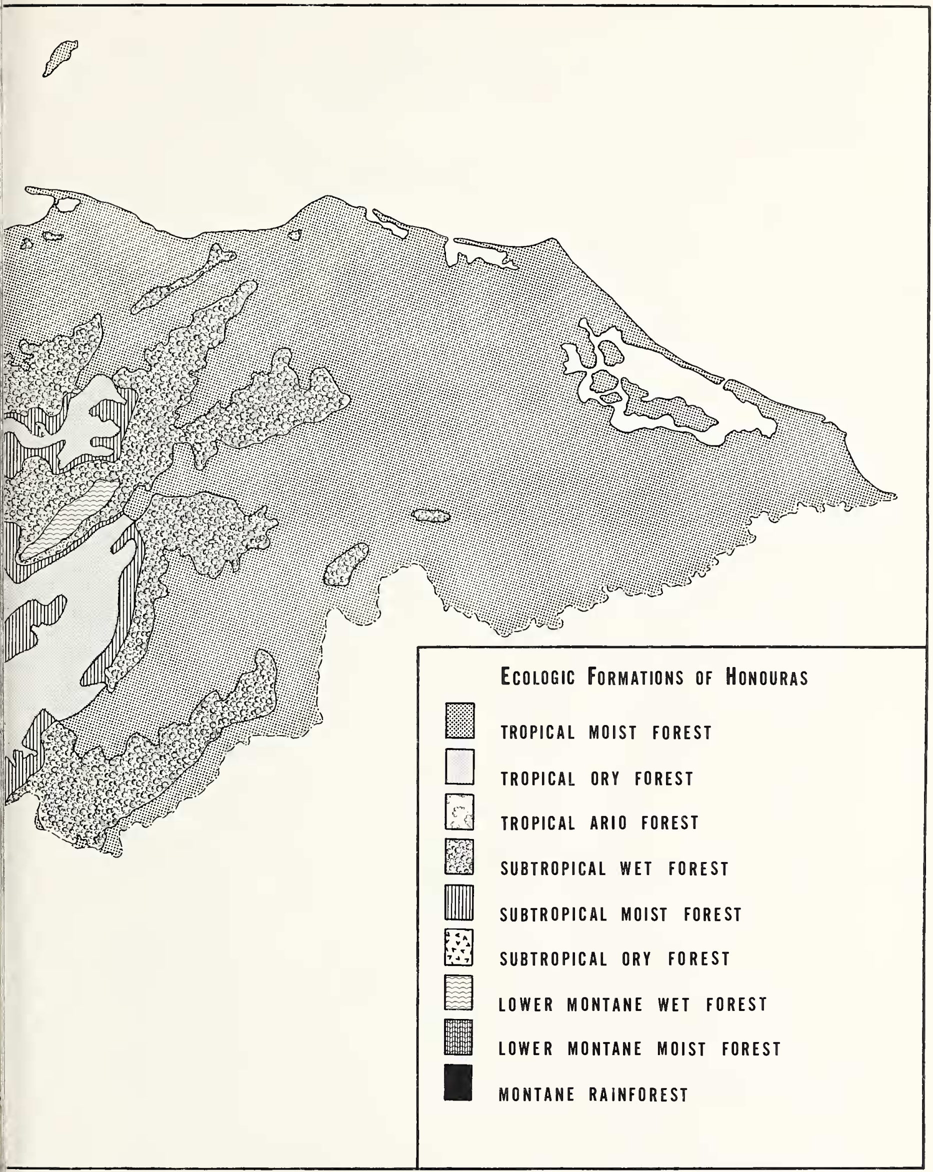


FIGURE 1. Ecologic formations (Bioclimat



Honduras (after Holdridge, 1962).

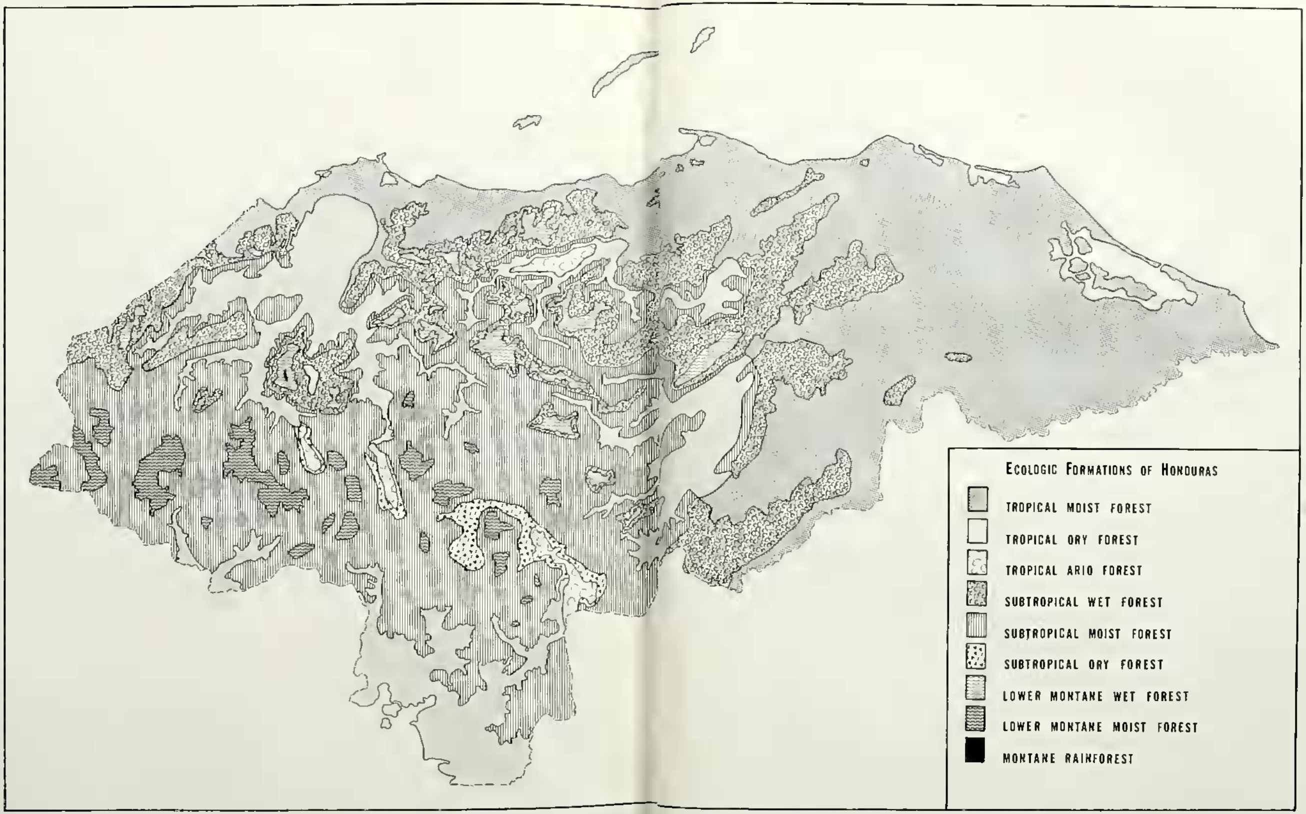


FIGURE 1. Ecologic formations (Bioclimates) of Honduras (after Holdridge, 1962).

Range.—Low and moderate elevations of the Atlantic versant from northeastern Honduras to Panamá.

Locality Records.—COLÓN: Río Sangrelaya, UMMZ 89461.

Ecologic Distribution.—Known only from near sea level in the Tropical Moist Forest Formation.

Eleutherodactylus rugulosus (Cope)

Liyla rugulosa Cope, 1869a: 160.

Eleutherodactylus rugulosus: Kellogg, 1932: 95.

Hylodes laevissimus Werner, 1896: 349.

Eleutherodactylus laevissimus: Dunn and Emlen, 1932: 23.

Eleutherodactylus ranoides: Dunn and Emlen, 1932: 23.

Eleutherodactylus ranoides nubicola Dunn and Emlen, 1932: 23.

Eleutherodactylus ranoides emleni Dunn, 1932: 97.

Eleutherodactylus rugulosus rugulosus: Lynch, 1965: 110 (in part); Lynch and Fugler, 1965: 10.

Range.—Low, moderate, and intermediate elevations from Veracruz, México on the Atlantic versant and Guerrero, México on the Pacific to Costa Rica.

Locality Records.—ATLÁNTIDA: Corozal, LACM 47859-78, LSUMZ 21542-51, 21553, 21555, 21563, 21566-67, 21570, 21577; mountains above Corozal, LACM 47879-84, 47915-28, LSUMZ 21552, 21556-62, 21564-65, 21568; 13 km E La Ceiba, LSUMZ 21569; 12 km SSE La Ceiba, KU 101167; 20 mi E Tela, LACM 47914; Tela, UMMZ 70329 (7); Lancetilla, MCZ 16184-88, 16284-85, 17448-50, 21270, AMNH 54792-96. COLÓN: 5 km SW Trujillo, LACM 47885-87, LSUMZ 21574-75; mountains above Trujillo, LSUMZ 22466; 0.5 km SW Trujillo, LACM 47888-93, LSUMZ 21571, 21573; Balfate, AMNH 45696-703. COMAYAGUA: Siguatepeque, MCZ 26421; between La Misión and Trincheras, AMNH 54752. COPÁN: Rancho El Jaral, LACM 45387; Copán, UMMZ 83016 (2); Río Copán, UMMZ 83024. CORTÉS: Hacienda Santa Ana, MCZ 17433-34, 21282; Río Guayoval, AMNH 54751; Agua Azul, AMNH 54951; Lago de Yojoa, MSU 4540, 4637; 1 mi W El Jaral, LACM 47894, 47912-13; 1 mi SE El Jaral, LACM 47895-96, 47898-904, 47911, 47940-48; 2.5 mi N El Jaral, LACM 47906-10; 2-3 mi W San Pedro Sula, LACM 47929-39. EL PARAISO: 1 km N Santa María, LACM 45076-78; 6 km E Danlí, TCWC 23811; Monserrat, MCZ 26433-35. FRANCISCO MORAZÁN: 31 km SE Tegucigalpa, LACM 39752; Zamorano, MCZ 25954-56, 26376-77, UMMZ 94055 (6), AMNH 54750; Agua Amarilla, AMNH 54833; San Juancito, ANSP 19876, FMNH 6157; Cerro Uyuca, MCZ 26440 (2). INTIBUCÁ: 5 km NE Jesús de Otoro, TCWC 23810. OLANCHO: 0.5 km WNW Catacamas, LSUMZ 21554; 2 km NW Catacamas, LACM 47858. SANTA BÁRBARA: Cerro Santa Bárbara, E slope, AMNH 55309-12, KU 66017-18, LACM 47905. YORO: Subirana Valley, MCZ 21283-86; Mataderos Mountains, MCZ 21287; Santa Marta, FMNH 21857-58, MCZ 21271-

72, 21288, UMMZ 77851 (3); Portillo Grande, FMNH 21859-60, MCZ 21273-75, 21289, UMMZ 77852 (3).

Ecologic Distribution.—Sea level to about 2000 meters in the Tropical Moist Forest, Subtropical Wet Forest, Subtropical Moist Forest, Lower Montane Wet Forest, and Lower Montane Moist Forest formations. This species was most frequently encountered at night along forest streams, but was occasionally found in the daytime in the same situations.

Genus *Leptodactylus* Fitzinger

KEY TO THE SPECIES OF *LEPTODACTYLUS* IN HONDURAS

1. Distinct light longitudinal stripe on posterior thigh; males lacking horny spines on thumb; males with paired, lateral, external vocal sacs. . . . *labialis*
1. Posterior thigh marbled, no distinct light longitudinal stripe; males with horny spine or spines on thumb; males with internal vocal sacs 2
2. Toes lacking prominent fringe, although sometimes with weak ridges; males with single horny spine on thumb; males with or without horny spines on chest; adults greater than 100 mm snout-vent length . . . . *pentadactylus*
2. Toes with prominent lateral fringes; males with two horny spines on thumb; males never with horny spines on chest; adults less than 50 mm snout-vent length . . . . *melanonotus*

Leptodactylus labialis (Cope)

Cystignathus labialis Cope, 1877: 90.

Leptodactylus labialis: Brocchi, 1881: 20; Dunn and Emlen, 1932: 23; Lynch and Fugler, 1965: 9.

Range.—Low and moderate elevations from Texas on the Atlantic versant and Guerrero, México on the Pacific to Costa Rica.

Locality Records.—CHOLUTECA: 1.2 mi E Choluteca, UMMZ 123611. COMAYAGUA: 2 mi S Comayagua, LACM 47522; 3 mi SSE Comayagua, LACM 47532; 3.5 mi WSW Siguatepeque, LACM 47531. COPÁN: Copán, FMNH 40864, UMMZ 83025; 6 mi SW La Florida, LACM 47523; 4.3 mi SW Santa Rosa de Copán, LSUMZ 22458. CORTÉS: Lago de Yojoa, MCZ 26407-09; E side Lago de Yojoa, KU 65657; 7 km SW La Lima, KU 65658; 2.5-4.5 mi ENE Villanueva, LACM 47524-30. EL PARAISO: 1 km N Santa María, LACM 45084-85. FRANCISCO MORAZÁN: Zamorano, LACM 39757, MCZ 25964-69, 26383-89; Cerro El Picacho, MCZ 28887-98. GRACIAS A DIOS: Ahuas, LACM 45245; Tancin, LACM 47511-16, LSUMZ 21338. OLANCHO: 8.6 mi E Catacamas, LACM 45101-03; 26 km NE Catacamas, LACM 45171-77, 45194-99; 1 km SE Catacamas, LSUMZ 21330; 1 km NW Catacamas, LSUMZ 21331-35; 4.5 km SE Catacamas, LSUMZ 21336; 7.6 mi SW Juticalpa, LACM 45238-40; Pataste, MSU 4536-38. SANTA BÁRBARA: Quimistán, USNM 128058-59. VALLE: 6 mi N Goascorán, LACM 45064; 3 mi E Goascorán, LACM 47520, UMMZ 123612; 7.5 mi E Goascorán, LACM 47521. YORO: 1.5 km W Olanchito, LACM 47517-19; Subirana Valley, MCZ 21260-61, 21263-69, FMNH 21821-24.

Ecologic Distribution.—Sea level to 1300 meters in the Tropical Moist Forest, Tropical Dry Forest, Tropical Arid Forest, Subtropical Wet Forest, and Subtropical Moist Forest formations. This species was usually found calling at night from covered holes in the ground near inundated areas, and one individual was taken in the daytime from beneath a log in oak-pine forest.

Leptodactylus melanonotus (Hallowell)

Cystignathus melanonotus Hallowell, 1860: 485.

Leptodactylus melanonotus: Brocchi, 1881: 20; Dunn and Emlen, 1932: 22; Orton, 1951: 62; Lynch and Fugler, 1965: 9.

Range.—Low and moderate elevations from Tamaulipas, México on the Atlantic versant and southern Sonora, México on the Pacific to Ecuador.

Locality Records.—ATLÁNTIDA: Corozal, LACM 47501-03, 47506-09, LSUMZ 21522-39; mountains above Corozal, LACM 47510; 20 mi E Tela, LACM 47505. CHOLUTECA: Río Choluteca, 5 km above Choluteca, MCZ 26460-62; 1.5 km NW Choluteca, KU 65676. COLÓN: 2 km E Trujillo, LSUMZ 21541; Balfate, AMNH 45725-28. COMAYAGUA: 17 km S Comayagua, TCWC 23802. COPÁN: Copán, UMMZ 83015 (39), 83016 (4), 83017 (6). CORTÉS: 1 mi SE El Jaral, LACM 47504; E side Lago de Yojoa, KU 65675. EL PARAISO: 1 km N Santa María, LACM 45086. FRANCISCO MORAZÁN: Zamorano, LACM 39758-59, KU 103218-19, MCZ 26390-94; Cerro El Picacho, MCZ 28903-23. ISLAS DE LA BAHÍA: Isla de Roatán, 0.5-2 km N Roatán, LACM 47490-93, LSUMZ 22376-78; Isla de Roatán, Roatán, LSUMZ 22319, 22333-34; Isla de Roatán, Oak Ridge, CM 27606-07; Isla de Guanaja, SE shore opposite Guanaja, LACM 47494, LSUMZ 22404; Isla de Guanaja, Sabana Bight, LSUMZ 22413-14; Isla de Guanaja, La Playa Hotel, LACM 47495-500. OLANCHO: 4.5 km SE Catacamas, LACM 47486-89; 8.6 mi E Catacamas, LACM 45097-100; 14.1 mi S Catacamas, LACM 45155; Catacamas, LACM 45143. VALLE: Goascorán, LACM 45061-62.

Ecologic Distribution.—Sea level to 1300 meters in the Tropical Moist Forest, Tropical Dry Forest, Tropical Arid Forest, Subtropical Wet Forest, and Subtropical Moist Forest formations. Adults and larvae were found in July and August in temporary ponds, inundated areas, and forest pools.

Leptodactylus pentadactylus (Laurenti)

Rana pentadactyla Laurenti, 1768: 32.

Leptodactylus pentadactylus: Boulenger, 1882: 241.

Leptodactylus pentadactylus dengleri: Lynch and Fugler, 1965: 9.

Range.—Low elevations of the Atlantic versant from Honduras to South America.

Locality Records.—COLÓN: Balfate, AMNH 45704, 45722; 2 km E Trujillo, LSUMZ 21541. GRACIAS A DIOS: Río Patuca, below Bilalmuk, MCZ 21259.

Ecologic Distribution.—Sea level to 100 meters in the Tropical Moist Forest Formation. One individual was taken at night on the ground in second growth forest.

Genus *Physalaemus* Fitzinger

Physalaemus pustulosus (Cope)

Paludicola pustulosa Cope, 1864: 180.

Physalaemus pustulosus: Lynch, 1970: 488.

Engystomops pustulosus: Dunn and Emlen, 1932: 22; Meyer, 1966: 173.

Eupemphix pustulosa pustulosa: Lynch and Fugler, 1965: 8.

Range.—Low and moderate elevations from Veracruz, México on the Atlantic versant and Oaxaca, México on the Pacific to South America.

Locality Records.—CHOLUTECA: 2.5 mi SE San Marcos de Colón, LSUMZ 21350-52; 6-10 km E Choluteca, KU 65636-41. COMAYAGUA: Siguatepeque, FMNH 4655; 0.5-2 mi E Villa San Antonio, LACM 47591-92; 3 mi SSE Comayagua, LACM 47616-19; 2 km E Siguatepeque, LSUMZ 22639-40; 4 km W Siguatepeque, LSUMZ 22631. COPÁN: 8 mi ENE Copán, LACM 47593-98; 12 mi ENE Copán, LACM 47599-600; 4-5 mi SE Santa Rosa de Copán, LACM 47604-12; 9 km S La Entrada, LSUMZ 22633-38. CORTÉS: 1 mi SE El Jaral, LACM 45374, 47614; Hacienda Santa Ana, FMNH 4602-11, 4690; 3 mi W San Pedro Sula, LACM 47615; Cofradía, MCZ 17439-47. FRANCISCO MORZÁN: 5.5 mi SW Valle de Ángeles, LACM 47577-78; Zamorano, LACM 39754, KU 103205-17; 31 km SE Tegucigalpa, LACM 39755-56; 1.5 mi S Zamorano, TCWC 19166-72. OCOTEPEQUE: 1 km W Nueva Ocotepeque, TCWC 23682-84; 6.5 mi E Nueva Ocotepeque, LACM 47601-03. OLANCHO: 8.6 mi E Catacamas, LACM 45111-31; 0.5 km WNW Catacamas, LACM 47579-83; 1 km SE Catacamas, LACM 47583-87; 1 km NW Catacamas, LACM 47588-90, LSUMZ 21339-44, 21348; 2-3 km NW Catacamas, LSUMZ 21349; 4.5 km SE Catacamas, LSUMZ 21345-47; Pataste, MSU 4509-24. SANTA BÁRBARA: 14 mi SW Sula, LACM 47613; 8 km E Quimistán, LSUMZ 22620; 17 km E Quimistán, LSUMZ 22622-23; 28 km SW Chamelecón, LSUMZ 22605. VALLE: San Lorenzo, MSU 4525-29.

Ecologic Distribution.—Sea level to 1400 meters in the Tropical Moist Forest, Tropical Dry Forest, Tropical Arid Forest, Subtropical Wet Forest, and Subtropical Moist Forest formations. This species was found breeding in June, July, and August in temporary ponds in cleared and brushy areas. In the wetter formations it occurs in disturbed situations.

Family Microhylidae

Genus *Gastrophryne* Fitzinger

Gastrophryne elegans (Boulenger)

Engystoma elegans Boulenger, 1882: 162.
Gastrophryne elegans: Stejneger, 1910: 166.

Range.—Low and moderate elevations of the Atlantic versant from Veracruz, México to Honduras.

Locality Records.—ATLÁNTIDA: Corozal, LACM 72069.

Ecologic Distribution.—The single specimen from the country was taken from the stomach of a snake, *Drymobius margaritiferus,* which was found in an area of pasture and second growth forest.

Genus *Hypopachus* Keferstein

Hypopachus variolosus (Cope)

Engystoma variolosum Cope, 1866: 131.
Hypopachus variolosus: Cope, 1869a: 166.
Hypopachus globulosus Schmidt, 1939: 2; Lynch and Fugler, 1965: 7.
Hypopachus championi: Lynch and Fugler, 1965: 7.
Hypopachus cuneus: Lynch and Fugler, 1965: 7.

Range.—Low and moderate elevations from southern Texas on the Atlantic versant and Sinaloa, México on the Pacific to Costa Rica.

Locality Records.—CHOLUTECA: 2.5 mi E San Marcos de Colón, LSUMZ 21491. COMAYAGUA: 3 mi SSE Comayagua, LACM 47569-76; 2 km E Siguatepeque, LSUMZ 22604. COPÁN: 5 mi SE Santa Rosa de Copán, LACM 47577; 9 km S La Entrada, LSUMZ 22641. CORTÉS: Laguna Ticamaya. FMNH 4641-42. FRANCISCO MORAZÁN: 5.5 mi SW Valle de Ángeles, LACM 47554. OCOTEPEQUE: 1 km W Nueva Ocotepeque, TCWC 23703-06. OLANCHO: 4.5 km SE Catacamas, LACM 47555-56. SANTA BÁRBARA: 14 mi SW Sula, LACM 47558-68. YORO: 0.5 km N Coyoles, LSUMZ 21489-90.

Ecologic Distribution.—From near sea level to 1400 meters in the Tropical Dry Forest, Tropical Arid Forest, and Subtropical Moist Forest formations. This species was found breeding in temporary ponds and inundated grassy areas in June, July, and August.

Family Ranidae

Genus *Rana* Linnaeus

KEY TO THE SPECIES OF *RANA* IN HONDURAS

1. Heel reaches beyond tip of snout; dorsum generally with elongate, glandlike ridges between prominent dorsolateral folds .... *pipiens*
1. Heel reaches no farther than nostril; dorsum never with elongate, glandlike ridges between the prominent dorsolateral folds 2

2. Toes two thirds webbed; sharp canthus rostralis; posterior thighs dark with light spots or bars; undersurface of hind limbs red in life .... *warschewitschii*
2. Toes fully webbed; rounded canthus rostralis; posterior thighs with a pattern of light and dark mottling; undersurface of hind limbs white to yellow in life 3
3. Diameter of tympanum greater than distance from anterior border of eye to nostril; no conspicuous light stripe from near nostril to angle of jaw, this region generally with light and dark mottling .... *palmipes*
3. Tympanum diameter less than distance from anterior border of eye to nostril; a conspicuous light stripe from near nostril to angle of jaw, the upper labial region never mottled .... *macroglossa*

Rana macroglossa Brocchi

Rana macroglossa Brocchi, 1877b: 177.

Rana palmipes: Dunn and Emlen, 1932: 25 (in part); Lynch and Fugler, 1965: 12 (in part).

Rana maculata: Lynch and Fugler, 1965: 12.

Rana pipiens: Lynch and Fugler, 1965: 13 (in part).

Range.—Low, moderate, and intermediate elevations of both versants from Chiapas, México to eastern Honduras.

Locality Records.—CHOLUTECA: 12.2 mi W San Marcos de Colón, UMMZ 118372. COMAYAGUA: between La Misión and Siguatepeque, AMNH 54895, MCZ 26468; Lago de Yojoa, Río Jaitique, AMNH 54776. COPÁN: Copán, UMMZ 83028 (11); 6 km NE Copán, 22603. CORTÉS: Agua Azul, AMNH 54909; 2.5 mi N El Jaral, LACM 47338-45; 3 mi W San Pedro Sula, LACM 47346-53. EL PARAISO: 7 km E Danlí, TCWC 23809; Portillo de Los Arados, AMNH 54753; Agua Fría, AMNH 54773. FRANCISCO MORAZÁN: 31 km SE Tegucigalpa, LACM 39763-67; San Juancito Mountains, ANSP 26290-91, AMNH 54896; Tatumbla, AMNH 54754; Tegucigalpa, MSU 4608-20, 4628-35; Zamorano, MCZ 25975, 26404; 10 km N Zamorano, MCZ 26467; Cerro Uyuca, AMNH 54768, KU 103226; 5 km WNW Zamorano, KU 103227; Rancho San Diego, AMNH 53934-38. INTIBUCÁ: 26 km W La Esperanza, LACM 45250-53; 5 km NE Jesús de Otoro, TCWC 23808; 1.5 mi NE La Esperanza, LACM 47354-56; La Esperanza, LACM 47357-59. OCOTEPEQUE: 1 km W Nueva Ocotepeque, TCWC 23710-12; 9 mi E Nueva Ocotepeque, LACM 47337. OLANCHO: 1.5 km NW Catacamas, LSUMZ 21508.

Ecologic Distribution.—From 200 to 1900 meters in the Tropical Moist Forest, Subtropical Wet Forest, Subtropical Moist Forest, and Lower Montane Moist Forest formations. This species was commonly encountered at night along streams, and larvae were found in streams in June, July, and August.

Rana palmipes Spix

Rana palmipes Spix, 1824: 29; Boulenger, 1920: 473; Dunn and Emlen, 1932: 25; Lynch and Fugler, 1965: 12 (in part).

Rana bonaccana Günther, 1902: 201.

Rana pipiens: Lynch and Fugler, 1965: 12 (in part).

Range.—Low and moderate elevations from Veracruz, México on the Atlantic versant and Oaxaca, México on the Pacific to the Amazon basin in South America.

Locality Records.—ATLÁNTIDA: Corozal, LACM 48285, LSUMZ 21501; Lancetilla, AMNH 54755, 54797; 20 mi E Tela, LACM 48294-96. COLÓN: 2 km E Trujillo, LACM 48286, LSUMZ 21502; Balfate, AMNH 45705, 45714-15; 48 km W La Ceiba, AMNH 55287. COPÁN: Río Higuito, ANSP 26664; 8 mi ENE Copán, LACM 48287-88; 12 mi ENE Copán, LACM 48289. CORTÉS: Agua Azul, AMNH 54953-54; Río Lindo, AMNH 54756; 2.5 mi ENE Villanueva, LACM 38290-93; 2-3 mi W San Pedro Sula, LACM 48297-301. GRACIAS A DIOS: Tancin, LACM 48279-82, LSUMZ 21495-97. ISLAS DE LA BAHÍA: Isla de Guanaja (Günther, 1902). OLANCHO: 8.6 mi E Catacamas, LACM 45107-08. YORO: 0.5 km N Coyoles, LACM 48283-84, LSUMZ 21498-500; Yoro, AMNH 16181-83.

Ecologic Distribution.—Sea level to 750 meters in the Tropical Moist Forest, Tropical Dry Forest, Subtropical Wet Forest, and Subtropical Moist Forest formations. This species was found in the daytime and at night near streams or inundated areas, and larvae were taken in these situations in June, July, and August.

Rana pipiens Schreber

Rana pipiens Schreber, 1782: 185; Dunn and Emlen, 1932: 25; Lynn, 1944: 190; Lynch and Fugler, 1965: 12 (in part).

Rana virescens austricola: Werner, 1896: 349.

Range.—Widespread from Canada to Panamá.

Locality Records.—ATLÁNTIDA: Corozal, LACM 48378. CHOLUTECA: 2.5 mi E San Marcos de Colón, LSUMZ 21621; 1.2 mi E Choluteca, UMMZ 118363. COLÓN: 2 km E Trujillo, LACM 48379, LSUMZ 22496; Puerto Castilla, LSUMZ 22472. COMAYAGUA: 3 mi SSE Comayagua, LACM 48407-10; 4 km W Siguatepeque, LSUMZ 22616; 2 km Siguatepeque, LSUMZ 22600. COPÁN: Copán, UMMZ 83027; Río Higuito, ANSP 26664; 8 mi ENE Copán, LACM 48380; 12 mi ENE Copán, LACM 48381-84; 5 mi SE Santa Rosa de Copán, LACM 48391-92. CORTÉS: 1 mi W El Jaral, LACM 48399; 1 mi SE El Jaral, LACM 48393, 48398, 48404; 1 mi NW El Jaral, LACM 48394-97; 2.5 mi ENE Villanueva, LACM 48400-02; 2 mi W San Pedro Sula, LACM 48403; San Pedro Sula, AMNH 55290-94; Agua Azul, AMNH 54931-34; E side Lago de Yojoa, KU 66127; Lago de Yojoa, MSU

4623-24, 4627. EL PARAISO: 1 km N Santa María, LACM 45071-75; Agua Fría, AMNH 54772. FRANCISCO MORAZÁN: 22 mi W Guaimaca, LACM 45087-88; San Juancito Mountains, ANSP 26292-97, AMNH 54764-65; Cerro Uyuca, AMNH 54766-67, 54840-46, 54769, KU 103228-36; Rancho San Diego, AMNH 53933; Tegucigalpa, MSU 4621-22; Montaña de Guaimaca, AMNH 54770-71. GRACIAS A DIOS: Patuca, USNM 20263-64. INTIBUCÁ: Río Pueblo Viejo, AMNH 54911; 1.5 mi NE La Esperanza, LACM 48405-06. ISLAS DE LA BAHÍA: Isla de Roatán, 0.5-2 km N Roatán, LSUMZ 21619-20, 22379; Isla de Roatán, Roatán, FMNH 34547-50, LSUMZ 22316-17. OCOTEPEQUE: 1 km W Nueva Ocotepeque, TCWC 23713; 6.5 mi E Nueva Ocotepeque, LACM 48385-90. OLANCHO: 8.6 mi E Catacamas, LACM 45104-06; 1 km NW Catacamas, LSUMZ 21616; 4.5 km SE Catacamas, LSUMZ 21617-18; 7.6 mi SW Juticalpa, LACM 45234. SANTA BÁRBARA: 28 km SW Chamelecón, LSUMZ 22601; YORO: Rancho San Lorenzo, LACM 48375-77; Subirana Valley, UMMZ 77853 (8).

Ecologic Distribution.—Sea level to 1900 meters in the Tropical Moist Forest, Tropical Dry Forest, Tropical Arid Forest, Subtropical Wet Forest, Subtropical Moist Forest, and Lower Montane Moist Forest formations. This species was usually encountered around permanent or temporary ponds, but on occasion was found along slow-moving streams.

Rana warschewitschii (Schmidt)

Ixalus warschewitschii Schmidt, 1857: 11.

Rana warschewitschii warschewitschii: Dunn, 1931: 416.

Range.—Low and moderate elevations of the Atlantic versant from eastern Honduras to Panamá; also on the Pacific versant in Costa Rica and Panamá.

Locality Records.—GRACIAS A DIOS: Moca, LACM 13946.

Ecologic Distribution.—Known only from about 50 meters in the Tropical Moist Forest Formation.

Family Rhinophrynidae

Genus *Rhinophrynus* Duméril and Bibron

Rhinophrynus dorsalis Duméril and Bibron

Rhinophrynus dorsalis Duméril and Bibron, 1841: 757; Duellman, 1966: 706; Duellman, 1971: 55.

Range.—Low elevations from southern Texas to Honduras on the Atlantic versant and Guerrero, México to Costa Rica on the Pacific.

Locality Records.—CORTÉS: La Lima, JD (2).

Ecologic Distribution.—Known only from about 30 meters in the Tropical Dry Forest Formation. We have not seen these specimens, but they have been examined and reported upon by Duellman (1971).

Species of Questionable Occurrence

The following species have been reported from Honduras in the literature, but the records are considered by us to be questionable or erroneous.

Copeotyphlinus syntremus (Cope).—This caecilian was described as *Siphonops syntremus* by Cope (1866), the unique specimen supposedly having been collected in "Honduras neighboring to British Honduras" (Taylor, 1968). Since the original description, the specimen has been lost, and subsequent workers (Dunn, 1942; Taylor, 1968) who have discussed its status have had to rely on Cope's description. Until additional specimens of this enigmatic form are discovered, we prefer to regard it as a questionable member of the Honduran herpetofauna.

Bufo ibarrai Stuart.—Lynch and Fugler (1965) recorded this species from the departments of El Paraiso, Francisco Morazán, and Cortés. All of the specimens involved, except one *Bufo valliceps* from Cortés, are referable to *Bufo coccifer,* which we consider to be a senior synonym of *Bufo ibarrai.*

Hyla crepitans Wied.—This species was recorded from Lago de Yojoa by Lynch and Fugler (1965), but according to the museum catalog the specimen in question came from Tela. No additional specimens of this Panamanian and South American species have been taken in this relatively well collected part of Honduras, and we believe that the specimen was erroneously recorded.

Hyla gabbi Cope.—This species, considered a junior synonym of *Smilisca* sordida (Duellman and Trueb, 1966), was reported by Dunn and Emlen (1932) from La Ceiba. The specimen in question has apparently been lost, but it seems probable that it was a misidentified *Smilisca baudinii.*

Eleutherodactylus brocchi (Boulenger).—Lynch and Fugler (1965) recorded this species from the department of Intibucá. In a later paper, Lynch (1965) reported on a specimen of this species (presumably the same specimen mentioned in the earlier paper) from Izabal, Honduras. This locality (a department, a lake, and a town all bear the name Izabal) is in Guatemala.

Eleutherodactylus rhodopis (Cope).—Lynch and Fugler (1965) reported this species from the mountains west of San Pedro Sula. We have not seen the specimens in question, but they are probably referable to *Eleutherodactylus gollmeri.* Lynch (personal communication) has advised us that he now believes that *E. rhodopis* does not occur in Honduras.

Gazetteer

The following names of places and geographical features are those referred to in the present study. Names in parentheses are departments, and numbers in parentheses indicate latitude north of the Equator, followed by longitude west of Greenwich. All distances and elevations given should be considered as approximate. If a locality is one that appears as a numbered point on the map (Figure 2), that number is indicated in brackets.

Agua Amarilla (FRANCISCO MORAZÁN)—on east slope of Cerro Uyuca, 5 km NW of Zamorano (14°02′, 87°05′)

Agua Azul (CORTÉS)—on east shore of Lago de Yojoa; 750 m (14°51′, 87°59′) [18]

Agua Fría (EL PARAISO)—10 km N Danlí; 1000 m (14°07′, 86°37′) [50]

Ahuas (GRACIAS A DIOS)—on Río Patuca, about 35 km upstream from mouth; 30 m (15°33′, 84°24′)

Almendros, Río (EL PARAISO)—in Valle de Jamastrán; 475 m

Amapa (CORTÉS)—20 km N of Lago de Yojoa; 100 m (15°03′, 87°59′)

Amapala (VALLE)—on Isla Tigre, Golfo de Fonseca (13°17′, 87°40′)

Arenal (EL PARAISO)—22 km ESE Los Paredes, on Río Coco; 370 m (13°48′, 85°49′) [52]

Balfate (COLÓN)—on Caribbean coast (15°48′, 86°25′) [30]

Barranca (COLÓN)—on Río Negro; 100 m (15°37′, 85°16′)

Berichiche (ATLÁNTIDA)—on Río Ulua, 28 km N of Progreso; 25 m (15°34′, 87°47′)

Bilalmuk (GRACIAS A DIOS)—on Río Patuca, 65 km upstream from the mouth; 25 m (15°19′, 84°38′)

Bilwas Dakra—on Nicaraguan side of Río Coco, but not located

Boon—on Nicaraguan side of Río Coco, 75 km upstream from mouth; 25 m (14°48′, 83°42′)

Callejon (OLANCHO)—on Río Coco; 250 m (14°15′, 85°25′)

Campamento (OLANCHO)—14 km E of Guaimaca; 670 m (14°33′, 86°42′)

Cangrejal, Río (ATLÁNTIDA)—emptying into the Caribbean, 2 km E of La Ceiba

Cantarranas (FRANCISCO MORAZÁN)—on Río Choluteca; 700 m (14°15′, 87°02′) [37]

Carmelina (ATLÁNTIDA)—30 km ESE Tela; 50 m (15°37′, 87°11′)

Catacamas (OLANCHO)—village in central Olancho; 500 m (14°54′, 85°56′) [54]

Chancaya, Río (YORO)—tributary of Río Cuyamapa, in western Yoro

Chamelecón (CORTÉS)—on Río Chamelecon; 75 m (15°24′, 88°01′) [21]

Choluteca (CHOLUTECA)—on Río Choluteca; 45 m (13°18′, 87°12′) [47]

Choluteca, Río—Pacific drainage, south-central Honduras

Claura, Río (COLÓN)—Caribbean drainage, 100 km E of Trujillo (16°00′, 85°04′)

Coco, Río—large river forming much of the border with Nicaragua and emptying into the Caribbean

Cocotá (GRACIAS A DIOS)—on Laguna Tancin, 13 km NW Puerto Lempira (15°15′, 83°53′)

Cofradía (CORTÉS)—on Río Chamelecon; 170 m (15°24′, 88°09′)

Cofradía (FRANCISCO MORAZÁN)—25 km N of Tegucigalpa; 1200 m (14°13′, 87°12′)

Colorado District (ATLÁNTIDA)—20 km E of Tela

Comayagua (COMAYAGUA)—on Río Comayagua; 580 m (14°25′, 87°37′) [14]

Comayagüela (FRANCISCO MORAZÁN)—on Río Choluteca, adjacent to Tegucigalpa; 950 m (14°05′, 87°13′)

Copán (COPÁN)—on Río Copán near Guatemalan border; 600 m (14°50′, 89°09′) [2]

Copán, Río (COPÁN)—tributary of Río Motagua, in western Copán

Corozal (ATLÁNTIDA)—on Caribbean coast, 15 km E of La Ceiba (15°48′, 86°43′) [29]

Coyoles (YORO)—on Río Aguan; 175 m (15°27′, 86°40′) [32]

Cropunta (GRACIAS A DIOS)—on Río Patuca, 30 km upstream from mouth; 25 m (15°32′, 84°22′) [58]

Cucuyagua (COPÁN)—on Río Higuito; 730 m (14°39′, 88°51′)

Cuyamapa, Río (YORO)—tributary of the Río Ulua, in western Yoro

Dakota (ATLÁNTIDA)—20 km SE of Tela; 25 m (15°37′, 87°21′)

Danlí (EL PARAISO)—on upper Río Guayambre; 750 m (14°00′, 86°35′) [49]

Dulce Nombre de Culmí (OLANCHO)—45 km NNE of Catacamas; 430 m (15°09′, 85°37′)

El Amatillo (VALLE)—on border with El Salvador; 50 m (13°35′, 87°45′)

El Jaral (CORTÉS)—at north end of Lago de Yojoa; 750 m (14°54′, 88°03′) [19]

El Jaral, Rancho (COPÁN)—12 km ENE of Copán; 730 m (14°50′, 89°05′)

El Mochito (SANTA BÁRBARA)—11 km SW of El Jaral; 800 m (14°50′, 88°07′)

El Negrito (YORO)—25 km SE of Progreso; 500 m (15°37′, 87°16′)

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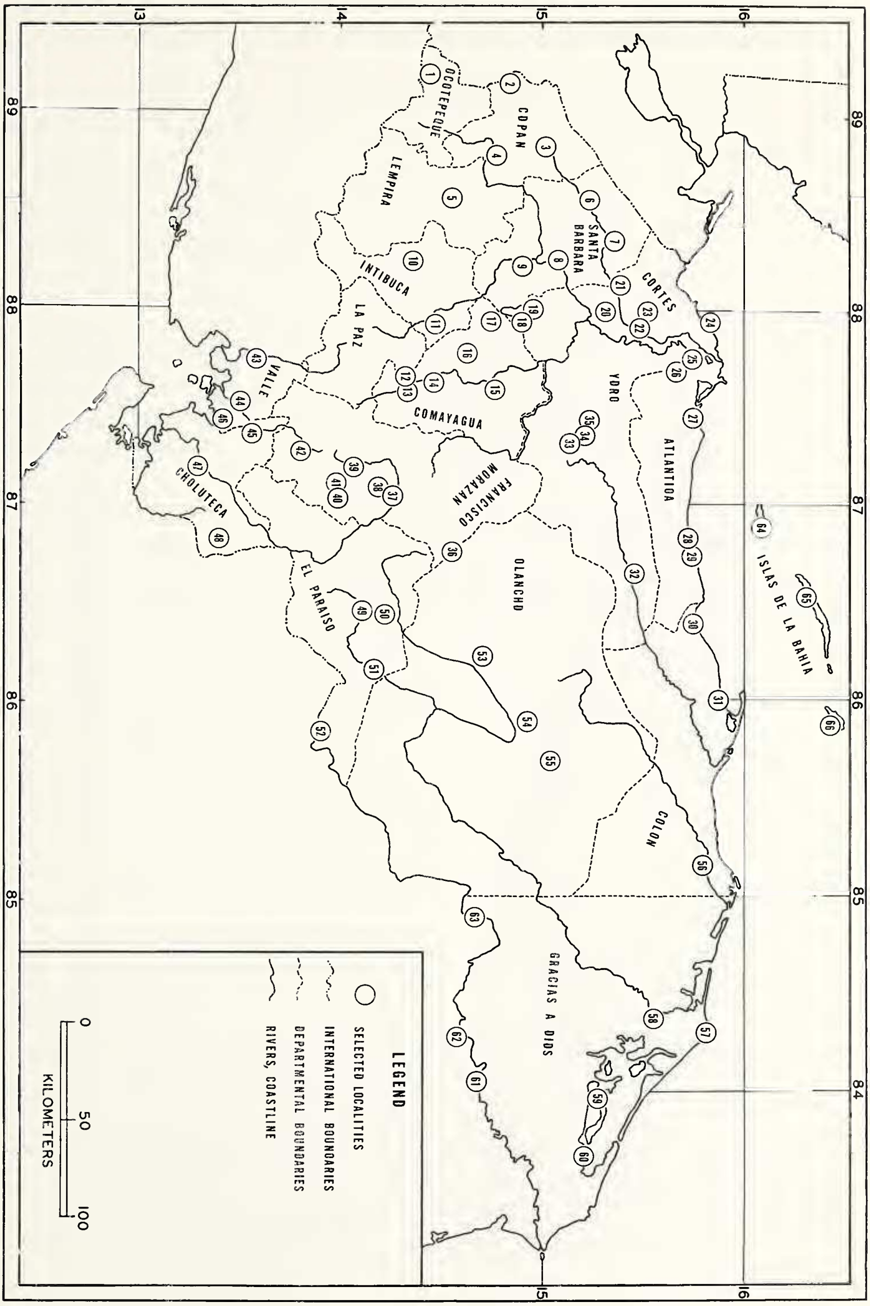
FIGURE 2. Departments and selected localities in Honduras. Localities mapped are: 1) Nueva Ocotepeque 2) Copán 3) La Florida 4) Santa Rosa de Copán 5) Gracias 6) Sula 7) Quimistán 8) Trinidad 9) Santa Bárbara 10) La Esperanza 11) Jesús de Otoro 12) La Paz 13) Villa San Antonio 14) Comayagua 15) La Libertad 16) Siguatepeque 17) La Misión 18) Agua Azul 19) El Jaral 20) Villanueva 21) Chamelecón 22) La Lima 23) San Pedro Sula 24) Puerto Cortés 25) Toloa 26) Guaymas District 27) Tela 28) La Ceiba 29) Corozal 30) Balfate 31) Trujillo 32) Coyoles 33) Portillo Grande 34) Subirana Valley 35) Mataderos Mountains 36) Montaña de Guaimaca 37) Cantarranas 38) San Juancito 39) Tegucigalpa 40) Zamorano 41) Cerro Uyuca 42) Sabana Grande 43) Goascorán 44) Nacaome 45) Pespire 46) San Lorenzo 47) Choluteca 48) San Marcos de Colón 49) Danlí 50) Agua Fría 51) Valle de Jamastrán 52) Arenal 53) Juticalpa 54) Catacamas 55) Pataste 56) Los Andes 57) Patuca 58) Cropunta 59) Tancin 60) Puerto Lempira 61) Kisalaya 62) Moca 63) Kiyras 64) Utila 65) Roatán 66) Guanaja.


LEGEND
SELECTED LOCALITIES
INTERNATIONAL BOUNDARIES
DEPARTMENTAL BOUNDARIES
RIVERS, COASTLINE
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14
15
16
89
88
87
86
85
84
OCOTEPEQUE
COPAN
LEMPIRA
SANTA BARBARA
CORTES
INTIBUCA
LA PAZ
YORO
ATLANTIDA
COMAYAGUA
VALLE
FRANCISCO MORAZAN
CHOLUTECA
EL PARAISO
OLANCHO
COLON
ISLAS DE LA BAHIA
GRACIAS A DIOS
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El Picacho, Cerro (FRANCISCO MORAZÁN)—6 km NE of Tegucigalpa; 1310 m (14°07′, 87°17′)
El Sauce (SANTA BÁRBARA)—near west shore of Lago de Yojoa; 800 m (14°50′, 88°05′)
Ébano, Laguna (GRACIAS A DIOS)—on Caribbean coast (15°53′, 84°52′)
Elena, Isla (ISLAS DE LA BAHÍA)—off eastern end of Isla de Roatán (16°48′, 86°30′)
Fortuna District (ATLÁNTIDA)—near village of Fortuna; 10 m (15°42′, 87°35′)
French Harbor (ISLAS DE LA BAHÍA)—on south shore of Isla de Roatán (16°23′, 86°24′)
Galeras (OLANCHO)—25 km W of Juticalpa; 660 m (14°42′, 86°30′)
Garcia Plantation (YORO)—on Río Ulua, but not located
Goascorán (VALLE)—on Río Goascorán; 70 m (13°36′, 87°45′) [43]
Gracias (LEMPIRA)—in north-central Lempira; 710 m (14°35′, 88°34′) [5]
Guadalupe (EL PARAISO)—on Río Yeguare; 700 m (14°03′, 86°50′)
Guaimaca (FRANCISCO MORAZÁN)—65 km NNE of Tegucigalpa; 815 m (14°32′, 86°51′)
Guaimaca, Montaña de (FRANCISCO MORAZÁN)—north of Guaimaca; 1500 m (14°33′, 86°50′) [36]
Guaimoreto (COLÓN)—15 km E of Trujillo (15°55′, 85°42′)
Gualpata (GRACIAS A DIOS)—14 km NW of Puerto Lempira on Laguna Tancin (15°15′, 83°54′)
Guanaja (ISLAS DE LA BAHÍA)—on east side of Isla de Guanaja (16°28′, 85°54′) [66]
Guanaja, Isla de (ISLAS DE LA BAHÍA)—easternmost of Bay Islands, 50 km north of mainland
Guana (EL PARAISO)—on the Río Coco near Arenal; 400 m (13°48′, 85°49′)
Guarunta, Río (GRACIAS A DIOS)—Caribbean drainage, about halfway between Río Coco and Río Patuca
Guaymas District (ATLÁNTIDA)—40 km WSW of Tela; 20 m (15°30′, 87°43′) [26]
Guayoval, Río (CORTÉS)—Río Ulua system, southern Cortés
Güinope (EL PARAISO)—in southwestern El Paraiso; 1300 m (13°51′, 86°55′)
Hicaque Farm (ATLÁNTIDA)—15 km E of Tela; 10 m (15°43′, 87°22′)
Higuito, Río—tributary of the Río Ulua in western Honduras
Jaitique, Río (COMAYAGUA)—tributary of Río Ulua and outlet for Lago de Yojoa
Jamastrán, Valle de (EL PARAISO)—upper valley of Río Guayambre, northeast of Danlí; 500 m (14°05′, 86°15′) [51]
Jesús de Otoro (INTIBUCÁ)—on Río Otoro; 700 m (14°26′, 88°06′) [11]
Jícaro Galán (VALLE)—10 km E of Nacaome; 20 m (13°31′, 87°28′)

Jonesville (ISLAS DE LA BAHÍA)—on south coast of Isla de Roatán (16°24′, 86°22′)

Juticalpa (OLANCHO)—in south-central Olancho; 450 m (14°42′, 86°15′) [53]

Kisalaya—on Nicaraguan side of Río Coco, 110 km upstream from mouth; 50 m (14°40′, 84°05′) [61]

Kiwas Tara (GRACIAS A DIOS)—on Río Coco, 75 km upstream from mouth; 40 m (14°50′, 83°53′)

Kiyras—on Nicaraguan side of Río Coco, 250 km upstream from mouth; 125 m (14°46′, 84°53′) [63]

Krasa—on Nicaraguan side of Río Coco, 175 km upstream from mouth; 90 m (14°40′, 84°45′)

La Ceiba (ATLÁNTIDA)—on Caribbean coast (15°47′, 86°40′) [28]

La Cumbre (CORTÉS)—ridge of Sierra de Omoa, 15 km S of San Pedro Sula; 1000 m (15°25′, 88°02′)

La Entrada (COPÁN)—10 km E of La Florida; 450 m (15°03′, 88°45′)

La Esperanza (INTIBUCÁ)—in west-central Intibucá; 1700 m (14°16′, 88°10′) [10]

La Florida (COPÁN)—in northwestern Copán; 460 m (15°02′, 88°50′) [3]

La Libertad (COMAYAGUA)—on Río Comayagua, 40 km N of Comayagua; 650 m (14°43′, 87°36′) [15]

La Lima (CORTÉS)—on Río Chamelecon, 15 km ESE of San Pedro Sula; 40 m (15°24′, 87°56′) [22]

La Misión (COMAYAGUA)—20 km NW of Siguatepeque; 780 m (14°37′, 87°58′) [17]

La Montañita (FRANCISCO MORAZÁN)—between Zamorano and Tegucigalpa; 1600 m (14°05′, 87°08′)

La Montañuela (EL PARAISO)—in mountains above Tabla Grande (13°54′, 86°50′)

La Paz (LA PAZ)—in northeastern La Paz; 750 m (14°16′, 87°40′) [12]

La Playa Hotel (ISLAS DE LA BAHÍA)—on northeastern shore of Isla de Guanaja

Lancetilla (ATLÁNTIDA)—8 km S of Tela; 30 m (15°42′, 87°28′)

Las Limas (COMAYAGUA)—in Comayagua Valley, not located

Lavenderos (EL PARAISO)—13 km SE of Zamorano (13°54′, 86°57′)

Lean, Río (ATLÁNTIDA)—Caribbean drainage, 15 km E of Tela

Leimus—on Nicaraguan side of Río Coco, 125 km upstream from mouth; 50 m (14°40′, 84°15′)

Los Andes (COLÓN)—on Río Sico near junction with Río Negro; 50 m (15°45′, 85°10′) [56]

Los Indios (YORO)—on Río Ulua, 15 km N of Progreso; 30 m (15°30′, 87°50′)

Los Limones (EL PARAISO)—15 km W of Danlí; 950 m (14°05′, 86°52′)

Los Paredes (EL PARAISO)—65 km ESE of Danlí on Río Coco; 425 m (13°56′, 85°58′)
Manzaragua (EL PARAISO)—5 km S of Güinope; 1150 m (13°48′, 86°59′)
Marcala (LA PAZ)—in west-central La Paz; 1220 m (14°07′, 88°00′)
Mataderos Mountains—see Monte Mataderos
Menocal, Rancho—not located
Minas de Oro (COMAYAGUA)—in northeastern Comayagua; 1040 m (14°46′, 87°20′)
Mistruc (GRACIAS A DIOS)—15 km W of Puerto Lempira on Laguna Tancin (15°08′, 83°53′)
Moca—on Nicaraguan side of Río Coco, 140 km upstream from mouth; 50 m (14°33′, 84°15′) [62]
Monserrat (EL PARAISO)—peak in Sierra El Chile; 2100 m (14°10′, 86°42′)
Monte Crudo (FRANCISCO MORAZÁN)—above Zamorano on Cerro Uyuca; 1900 m
Monte Mataderos (YORO)—25 km W of Yoro; 1200 m (15°08′, 87°19′) [35]
Nacaome (VALLE)—on Pacific coastal plain; 30 m (13°31′, 87°30′) [44]
Nueva Ocotepeque (OCOTEPEQUE)—in southwestern Ocotepeque; 805 m (14°26′, 89°11′) [1]
Oak Ridge (ISLAS DE LA BAHÍA)—on south shore of Isla de Roatán (16°24′, 86°21′)
Ojo de Agua (EL PARAISO)—on Río Choluteca, 30 km E of Danlí (14°05′, 86°45′)
Ola (CHOLUTECA)—on Río Choluteca, 10 km E of Choluteca; 20 m (13°19′, 87°22′)
Olanchito (YORO)—on Río Aguan; 170 m (15°30′, 86°35′)
Omoa (CORTÉS)—on Caribbean coast, 15 km SW of Puerto Cortés (15°43′, 88°02′)
Pataste (OLANCHO)—25 km NE of Catacamas; 450 m (14°57′, 85°45′) [55]
Patuca (GRACIAS A DIOS)—on Caribbean coast at former mouth of Río Patuca (15°50′, 84°17′) [57]
Patuca, Río—Caribbean drainage, northeastern Honduras
Peru (CORTÉS)—between San Pedro Sula and Cofradía (15°25′, 88°07′)
Pespire (CHOLUTECA)—on Río Nacaome; 200 m (13°34′, 87°23′) [45]
Pito Solo (COMAYAGUA)—at south end of Lago de Yojoa; 750 m (14°43′, 88°00′)
Portillo de Los Arados (EL PARAISO)—6 km NW of Güinope; 1530 m (13°52′, 86°59′)
Portillo Grande (YORO)—20 km SW of Yoro; 1300 m (15°05′, 87°16′) [33]
Porterillos (CORTÉS)—35 km S of San Pedro Sula; 75 m (15°11′, 87°58′)
Progreso (YORO)—on Río Ulua; 30 m (15°21′, 87°48′)
Progreso District (YORO)—near town of Progreso

Pueblo Viejo, Río (INTIBUCÁ)—tributary of the Río Ulua in eastern Intibucá

Puerto Arturo (ATLÁNTIDA)—on Caribbean coast, 5 km SW of Tela (15°43′, 87°30′)

Puerto Castilla (COLÓN)—on Caribbean coast, 15 km NNW of Trujillo (16°01′, 86°01′)

Puerto Cortés (CORTÉS)—on Caribbean coast (15°48′, 87°56′) [24]

Puerto Lempira (GRACIAS A DIOS)—on Caribbean coast near Nicaraguan border (15°13′, 83°47′) [60]

Puerto Salamar (VALLE)—on Golfo de Fonseca, 5 km E of San Lorenzo (13°25′, 87°25′)

Quimistán (SANTA BÁRBARA)—on Río Chamelecón; 190 m (15°20′, 88°23′) [7]

Rancho Quemado (FRANCISCO MORAZÁN)—in mountains above San Juancito; 1500 m (14°10′, 87°08′)

Río Lindo (CORTÉS)—8 km N of Lago de Yojoa; 200 m (15°00′, 88°01′)

Roatán (ISLAS DE LA BAHÍA)—on south side of Isla de Roatán (16°18′, 86°35′) [65]

Roatán, Isla de (ISLAS DE LA BAHÍA)—largest of Bay Islands, 60 km north of mainland

Sabana Bight (ISLAS DE LA BAHÍA)—on northeastern shore of Isla de Guanaja

Sabana Grande (FRANCISCO MORAZÁN)—35 km S of Tegucigalpa; 1100 m (13°58′, 87°17′) [42]

Sacpuka—on Nicaraguan side of Río Coco, 115 km upstream from mouth; 50 m (14°40′, 84°05′)

San Antonio del Oriente (FRANCISCO MORAZÁN)—6 km N of Zamorano; 1100 m (14°02′, 87°02′)

San Francisco (CHOLUTECA)—15 km W of Nicaraguan border; 910 m (13°23′, 86°55′)

San Juancito (FRANCISCO MORAZÁN)—20 km NE of Tegucigalpa; 1000 m (14°13′, 87°05′) [38]

San Juancito Mountains (FRANCISCO MORAZÁN)—NE of Tegucigalpa; 2200 m

San Lorenzo (VALLE)—on Golfo de Fonseca (13°25′, 87°27′) [46]

San Lorenzo, Rancho (YORO)—25 km WSW of Coyoles; 220 m (15°23′, 86°52′)

San Luis (OLANCHO)—on Río Guayape, 25 km SE of Catacamas; 400 m (14°37′, 86°02′)

San Manuel (CORTÉS)—8 km E of Villanueva; 35 m (15°18′, 87°54′)

San Marcos de Colón (CHOLUTECA)—8 km W of Nicaraguan border; 980 m (13°25′, 86°49′) [48]

San Pedro Sula (CORTÉS)—in central Cortés; 100 m (15°28′, 88°01′) [23]

Santa Ana, Hacienda (CORTÉS)–2 km W of San Pedro Sula; 100 m (15°28′, 88°01′)
Santa Ana, Río–see Santa Ana Canyon
Santa Ana Canyon (CORTÉS)–canyon of Río Santa Ana, 2 km W of San Pedro Sula
Santa Ana Mountains (CORTÉS)–that part of Sierra de Omoa immediately west of San Pedro Sula
Santa Bárbara (SANTA BÁRBARA)–in north-central Santa Bárbara; 160 m (14°53′, 88°14′) [9]
Santa Bárbara, Cerro–west of Lago de Yojoa; 2900 m (14°47′, 88°07′)
Santa Clara (FRANCISCO MORAZÁN)–5 km E of Zamorano; 800 m (14°02′, 87°00′)
Santa Cruz de Yojoa (CORTÉS)–10 km NE of Lago de Yojoa; 520 m (14°52′, 87°54′)
Santa María (EL PARAISO)–in Valle de Jamastrán, 35 km NNE of Danlí; 500 m (14°10′, 86°15′)
Santa Marta (YORO)–25 km SW of Yoro; 1300 m (15°04′, 87°17′)
Santa Rita (COMAYAGUA)–in Comayagua Valley, not located
Santa Rita (COPÁN)–8 km NE of Copán; 670 m (14°52′, 89°05′)
Santa Rosa de Copán (COPÁN)–in southeastern Copán; 1150 m (14°48′, 88°48′) [4]
Siguatepeque (COMAYAGUA)–25 km SE of Lago de Yojoa; 1150 m (14°32′, 87°48′) [16]
Sopametepe (YORO)–25 km W of Coyoles; 275 m (15°23′, 86°52′)
Subirana Ranch (YORO)–in Subirana Valley; 900 m (15°09′, 87°15′)
Subirana Valley (YORO)–15 km WSW of Yoro [34]
Sula (SANTA BÁRBARA)–on Río Chamelecón, 60 km SW of Chamelecón; 210 m (15°15′, 88°33′) [6]
Sulaco Mountains (YORO)–southwest of Yoro; 2000 m
Tabla Grande (EL PARAISO)–20 km SE of Zamorano; 1260 m (13°54′, 86°50′)
Talanga (FRANCISCO MORAZÁN)–40 km NNE of Tegucigalpa; 820 m (14°23′, 87°06′)
Tancin (GRACIAS A DIOS)–15 km NW of Puerto Lempira on Laguna Tancin (15°15′, 83°54′) [59]
Tancin, Laguna (GRACIAS A DIOS)–on Caribbean coast in northeastern Honduras (15°53′, 83°55′)
Tatumbla (FRANCISCO MORAZÁN)–12 km SE of Tegucigalpa; 1400 m (14°01′, 87°06′)
Taulabé (COMAYAGUA)–14 km NW of Siguatepeque; 430 m (14°38′, 87°59′)
Tegucigalpa (FRANCISCO MORAZÁN)–on upper Río Choluteca; 930 m (14°04′, 87°13′) [39]
Tela (ATLÁNTIDA)–on Caribbean coast (15°43′, 87°29′) [27]

Tela District (ATLÁNTIDA)—west of Tela along Río Ulua
Ticamaya, Laguna (CORTÉS)—20 km NE of San Pedro Sula; 30 m (15°31′, 87°53′)
Tigre, Isla (VALLE)—25 km SW of San Lorenzo in Golfo de Fonseca
Toloa (ATLÁNTIDA)—35 km WSW of Tela on Río Ulua; 10 m (15°41′, 87°46′) [25]
Toloa Creek Plantation (ATLÁNTIDA)—near village of Toloa
Trincheras (COMAYAGUA)—10 km SE of La Misión; 950 m (14°35′, 87°54′)
Trincheras, Barranca de (COMAYAGUA)—not located, but presumably near village of Trincheras
Trinidad (SANTA BÁRBARA)—25 km NNE of Santa Bárbara; 200 m (15°07′, 88°16′) [8]
Trujillo (COLÓN)—on Caribbean coast (15°55′, 85°59′) [31]
Ulúa, Río—Caribbean drainage, western Honduras
Uluita (ATLÁNTIDA)—18 km WSW of Tela; 15 m (15°40′, 87°33′)
Utila (ISLAS DE LA BAHÍA)—on south side of Isla de Utila (16°07′, 86°52′) [64]
Utila, Isla de (ISLAS DE LA BAHÍA)—westernmost of Bay Islands, 40 km north of mainland
Uyuca, Cerro (FRANCISCO MORAZÁN)—southeast of Tegucigalpa; 2000 m (13°57′, 87°08′) [41]
Valle de Angeles (FRANCISCO MORAZÁN)—20 km ENE of Tegucigalpa; 1400 m (14°09′, 87°03′)
Ventas (FRANCISCO MORAZÁN)—not located, but may be La Venta, a locality 10 km SW of Sabana Grande
Viejo Intibucá (INTIBUCÁ)—not located, but probably in upper Otoro Valley near Jesús de Otoro
Villa San Antonio (COMAYAGUA)—18 km SSE of Comayagua; 650 m (14°16′, 87°36′) [13]
Villanueva (CORTÉS)—20 km S of San Pedro Sula; 70 m (15°17′, 88°00′) [20]
Yojoa, Lago de—in west-central Honduras; 750 m (14°50′, 88°00′)
Yorito (YORO)—16 km SSW of Yoro; 760 m (15°02′, 87°12′)
Yoro (YORO)—in central Yoro; 720 m (15″09′, 87°07′)
Zacate Grande, Isla (VALLE)—15 km SW of San Lorenzo in Golfo de Fonseca
Zambrano (FRANCISCO MORAZÁN)—28 km NE of Tegucigalpa; 1250 m (14°14′, 87°24′)
Zamorano (FRANCISCO MORAZÁN)—21 km SE of Tegucigalpa; 790 m (14°00′, 87°02′) [40]
Zapotillo (EL PARAISO)—22 km E of Danlí; 450 m (14°03′, 86°20′)

RESUMEN

La fauna anfibia de la República de Honduras es listada. Se dan para cada una de los 52 especies que forman la fauna de anfibios, sinonomias breves, una declaración de las áreas completas de distribución, una lista de datos de localidades, y una declaración de la distribución ecologica en Honduras. Claves de identificación se proviene. Son agregados una lista de las especies de cuestionable ocurrencia en Honduras y una gacetilla de las localidades herpetologicas.

LITERATURE CITED

BARBOUR, T. 1926. New amphibia. Occ. Pap. Boston Soc. Nat. Hist. 5: 191-194.

———, and E. R. DUNN. 1921. Herpetological novelties. Proc. Biol. Soc. Washington 34: 157-162.

BOETTGER, O. 1893. Ein neuer Laubfrosch aus Costa Rica. Bericht. Senck. Nat. Ges. 1892-93: 251-252.

BOULENGER, G. A. 1882. Catalogue of the Batrachia Salientia s. Eucaudata in the British Museum. 2nd ed. London. 503 p.

———. 1891. Notes on American batrachians. Ann. Mag. Nat. Hist., ser. 6, 8: 453-457.

———. 1920. A monograph of the American frogs of the genus *Rana*. Proc. Amer. Acad. Arts and Sci. 55(9): 413-480.

BRAME, A. H., JR. 1967. A list of the world's recent and fossil salamanders. Herpeton 2(1): 1-26.

———. 1968. Systematics and evolution of the Mesoamerican salamander genus *Oedipina*. J. Herp. 2(1-2): 1-64.

BRATTSTROM, B. H., and T. H. HOWELL. 1954. Notes on some collections of amphibians and reptiles from Nicaragua. Herpetologica 10(2): 114-123.

BROCCHI, P. 1877a. Description d'un nouvelle genre de Phanéroglosse Hylaeforme (*Plectrohyla Guatemalensis*). Bull. Soc. Philom. Paris, ser. 7(1): 92-93.

———. 1877b. Sur quelques Batraciens Raniformes et Bufoniformes de l'Amérique Centrale. Bull. Soc. Philom. Paris, ser. 7(1): 175-197.

———. 1881. Étude des Batraciens de l'Amérique Centrale. Miss. Sci. Mex. et Centr. Amer., part 3(2): 1-122.

COPE, E. D. 1862. Catalogues of the reptiles obtained during the explorations of the Parana, Paraguay, Vermejo, and Uraguay rivers . . . Proc. Acad. Nat. Sci. Phila. 14(9): 346-359.

———. 1864. Contributions to the herpetology of tropical America. Proc. Acad. Nat. Sci. Phila. 16: 166-181.

———. 1865a. Third contribution to the herpetology of tropical America. Proc. Acad. Nat. Sci. Phila. 17: 195.

———. 1865b. Sketch of the primary groups of Batrachia Salientia. Nat. Hist. Rev. 1865: 97-120.

———. 1866. Fourth contribution to the herpetology of tropical America. Proc. Acad. Nat. Sci. Phila. 18: 123-132.

———. 1869a. Seventh contribution to the herpetology of tropical America. Proc. Amer. Philos. Soc. 11: 147-169.

———. 1869b. A review of the species of the Plethodontidae and Desmognathidae. Proc. Acad. Nat. Sci. Phila. 21: 93-118.

———. 1875. Check-list of North American Batrachia and Reptilia. U.S. Nat. Mus. Bull. 1: 1-104.

———. 1877. Tenth contribution to the herpetology of tropical America. Proc. Amer. Philos. Soc. 17: 85-98.

———. 1886. Thirteenth contribution to the herpetology of tropical America. Proc. Amer. Philos. Soc. 23: 271-287.

DUELLMAN, W. E. 1956. The frogs of the hylid genus *Phrynohyas* Fitzinger, 1843. Misc. Publ. Mus. Zool. Univ. Mich. 96: 1-47.

———. 1963. A review of the Middle American tree frogs of the genus *Ptychohyla*. Univ. Kans. Publ. Mus. Nat. Hist. 15(7): 297-349.

———. 1966. The Central American herpetofauna: an ecological perspective. Copeia 1966(4): 700-719.

———. 1971. The burrowing toad, *Rhinophrynus dorsalis*, on the Caribbean lowlands of Central America. Herpetologica 27(1): 55-56.

——— and M. J. FOUQUETTE, JR. 1968. Middle American frogs of the *Hyla microcephala* group. Univ. Kans. Publ. Mus. Nat. Hist. 17(12): 517-557.

———, and L. TRUEB. 1966. Neotropical hylid frogs, genus *Smilisca*. Univ. Kans. Publ. Mus. Nat. Hist. 17(7): 281-375.

DUMERIL, A. 1853. Memoire sur les batraciens anoures de la famille des Hylaeformes . . . Ann. Sci. Nat., ser. 3, Zool. 19: 135-179.

DUMERIL, A. M. C., and G. BIBRON. 1841. Erpétologie générale ou histoire naturelle compléte des reptiles. 8: 1-792.

———, and A. DUMERIL. 1854. Erpétologie générale ou histoire naturelle compléte des reptiles. 9: 1-440.

DUNN, E. R. 1924. New salamanders of the genus *Oedipus* with a synoptical key. Field Mus. Nat. Hist., Zool. Ser. 12(7): 95-100.

———. 1926. The salamanders of the family Plethodontidae. Smith College Anniv. Ser., Smith College, Northampton, Mass. 441 p.

———. 1928. Notes on Central American caecilians. Proc. New England Zool. Club 10: 71-76.

———. 1931. The amphibians of Barro Colorado Island. Occ. Pap. Boston Soc. Nat. Hist. 5: 403-421.

———. 1932. A preoccupied name in *Eleutherodactylus*. Copeia 1932(2): 97.

———. 1933. A new *Hyla* from Panama Canal Zone. Occ. Pap. Boston Soc. Nat. Hist. 8: 61-64.

———. 1942. The American caecilians. Bull. Mus. Comp. Zool., Harvard Univ. 91(6): 439-540.

———, and J. T. EMLEN, JR. 1932. Reptiles and amphibians from Honduras. Proc. Acad. Nat. Sci. Phila. 84: 21-32.

ECHTERNACHT, A. C. 1968. Distributional and ecological notes on some reptiles from northern Honduras. Herpetologica 24(2): 151-158.

FIRSCHEIN, I. L. 1950. A new toad from Mexico with a redefinition of the *cristatus* group. Copeia 1950(2): 81-87.

FUNKHOUSER, A. 1957. A review of the neotropical tree frogs of the genus *Phyllomedusa*. Occ. Pap. Nat. Hist. Mus. Stanford. Univ. 5: 1-90.

GAIGE, H. T., and L. C. STUART. 1934. A new *Hyla* from Guatemala. Occ. Pap. Mus. Zool. Univ. Mich. 281: 1-3.

GUNTHER, A. 1885-1902. Biologia Centrali-Americana. Reptilia and Batrachia. Taylor and Francis, London. 326 p.

HALLOWELL, E. 1860. Report on the reptilia of the North Pacific Exploring Expedition, under the command of Capt. John Rogers, U.S.N. Proc. Acad. Nat. Sci. Phila. 12: 480-486.

HEMMING, F. (ed.) 1958. Opinion 520. Suppression under the plenary powers of the specific name *tibiatrix* Laurenti, 1768, . . . Opin. Declar. Intl. Comm. Zool. Nomen. 19: 169-200.

HOLDRIDGE, L. R. 1962. Mapa ecologico de Honduras. Organización de los Estados Americanos, San Jose, Costa Rica.

———. 1964. Life zone ecology. Trop. Sci. Center, San Jose, Costa Rica.